

Achieving sustainable low carbon travel

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Introduction



Fig 1. Courtesy of Peterborough City Council,2018.

"We are facing challenging times. Reducing greenhouse gas emissions by 2022 is an efficient way to do this, and many experts believe that the planet we live on is under threat, with carbon emissions being one of the biggest contributors." (Peters et al, 2013; Hu et al, 2015).

Whether it's improving a country's economy or how to have a healthy body, which we often discuss. In terms of transport modes are not enough to threaten the environment in which we live. "The mode of transport is one of the biggest influencing factors. Low-emissions transport is also one of our top priorities. Today, the price of petrol is constantly rising. It is becoming more and more expensive and this has caught our attention. Then there are things like the cost of heating a home and the cost of electricity for the home, everything is becoming more expensive. "(Abrahamse and Steg, 2011) So maybe we need to think more about the amount of energy we consume in all aspects of our lives. My job is therefore to hopefully raise awareness among commuters that there may be better, low-carbon ways to travel to and from work. The initial focus on how to do this is that I want to try to encourage people to travel in a low-carbon way. This approach has two important advantages, firstly it is energy efficient secondly it is environmentally friendly and helps to slow down global warming and environmental degradation. This is an urgent issue. It is every citizen's responsibility to reduce carbon emissions and to choose low carbon travel. High-carbon travel is a problem, so we are trying to encourage people to use more environmentally friendly modes of transport. I have focused my research on the topic of low carbon travel.

Part One –Low carbon travel delivery



Fig 2. Courtesy of Peterborough City Council,2018.

“Low carbon means not only in terms of transport choices, but also in terms of using things in our lives that are so low energy that they reduce carbon emissions. Carbon dioxide emissions are one of the major impacts and high emissions can cause damage to the environment and air pollution. Reducing carbon dioxide emissions means living with low energy consumption, low consumption and low expenses ”(Jabareen, 2016).

For example, when we specify a plan before travelling, we tailor an active travel plan according to the distance and geographical location of the journey. I have previously looked at data analysis from the UK Department for Transport and in 2006 the government in London and some European towns and cities increased cycling to encourage people to use bicycles to travel to reduce carbon emissions. Until 2008, the number of trips made by bicycle increased rapidly and local air and environmental

quality continued to improve. This was confirmed by the fact that cycling is a good option for a low carbon approach.

"Of all modes of transport, cars are more polluting, with their gas emissions polluting the environment and their noise affecting people's lives." (Banister, 2008) Most households own cars because when it takes a long time to wait for a bus when commuting, or when cycling to work a long way from home, driving allows you to travel efficiently so you are not late. However, the increase in the number of cars has also led to an increased probability of traffic jams, reducing the efficiency of travel and not taking advantage of the benefits of choosing to travel by car. When this happens, the best way to travel is by metro, which does not have to deal with traffic jams and consumes less energy and pollution.

After analysing the above, it can be concluded that the vast majority of people use the car as a relatively high-carbon transport route. On the one hand, people find this mode of transport more convenient, and on the other hand, they save time waiting for public transport.

"According to a BBC report the price of petrol in the UK has risen steadily since September 2021, reaching its highest price in eight years. There is also a shortage of petrol at petrol stations and even if you can get petrol at a petrol station, there is a long queue to finish filling up. " (BBC Report, 2021, below, Figure 3) This has made it very difficult for people in the UK to travel and live their daily lives. Taxi drivers have been unable to travel as a result of the petrol shortage and have seen their incomes

fall. To make matters worse, the inability of paramedics to refuel ambulances has affected the speed of rescue operations.

When we are trying to save money and resources, cycling and taking public transport are the best options. Using the plan for low carbon travel as an entry point, I want to advocate low carbon travel for everyone.

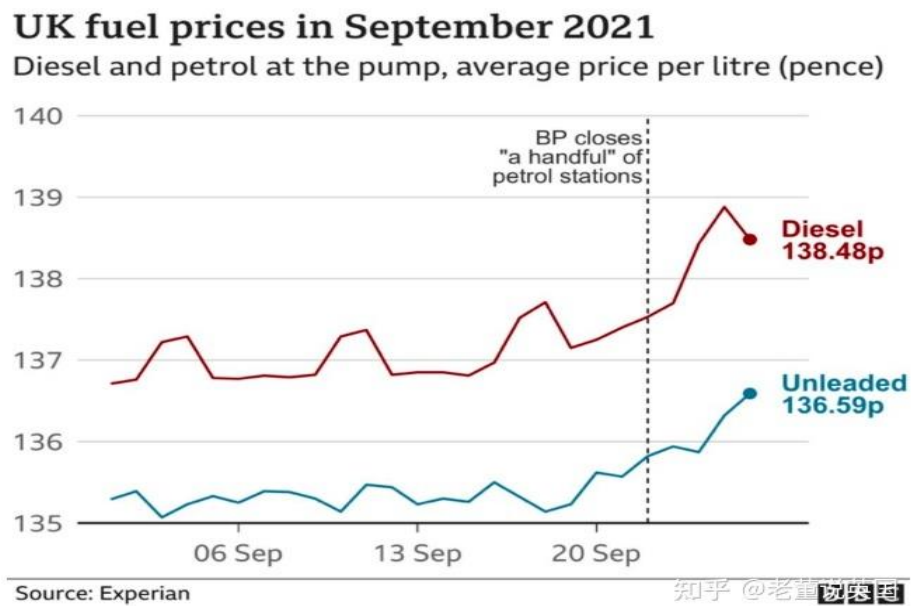


Fig 3. Source website: UK oil price increase from September 2021

Part Two – Low Carbon Travel Initiative Menu

In this section I want to illustrate the benefits of specific ways of travelling low carbon, I want to encourage people to use low carbon methods and address the concerns that people have about low carbon travel being a good choice. The first low carbon way of travel I would like to talk about is walking. "According to research if a commuter spends money on commuting by car, it would take 40% more money by earning outside of work to feel the same level of happiness as someone who commutes by foot every day. In terms of considering people's physical health travelling on foot can improve mental health and physical health, making the body stronger. What's more worth mentioning is the savings in fuel costs associated with cars if one chooses to travel on foot every day." (Shanghai Transition Release, 2021)

Of course, this also requires commuters to consider whether or not they need to choose a walking mode of travel depending on where they are from home to work. If the distance to work is long, there is a high probability that walking will take a lot of time and that you will be late for work, and there is a high probability that too much walking will cause physical injury or even death.

If you are outdoors, there are many advantages to choosing a low-carbon way of getting around by jogging. By jogging regularly in nature, you can breathe fresh air and enjoy the beautiful surroundings can make people feel very happy and even have an effect on treating depression. Walking is also a natural sedative. "Regular walking exercises can increase the excitability of the nervous system and suppress depression,

leaving people in good spirits, physically relaxed and energised after a walk". (Tencent, 2019)

Jogging is considered to be the best way to exercise the whole body, but it is no longer the best way. After taking into account safety and time saving factors, we have found that a safer, easier, more effective and more beneficial form of exercise is walking. Walking is more effective and safer than jogging, especially for women who rarely exercise and for people over 30." The unthinking choice of running for exercise leads to an increased probability of injury to knees, tendons and other parts of the body; when people with difficulties with organs such as the heart, kidneys, liver or metabolic system suffer from a severe lack of blood oxygen supply. " (Nunally, 1978) When we are walking, the impact on the soles of one's feet is about one to two times the weight, and in the case of comparison with jogging methods, jogging alone accounts for about 1/3 of the impact on the body, and walking improves the immune system and slows down ageing. Walking is the most relevant and good way to live, it is the most economical form of exercise and it is incredibly effective. When we walk regularly for exercise, we can reduce the probability of heart disease by 30%, reduce the probability of diabetes by 50%, and also combat mental depression and neurosis. Walking at the right intensity and for the right length of time, and keeping it up, can boost the function of the immune system and slow down the ageing of the immune organs.

During the COVID-19 outbreak, the UK government tried to limit the number of cars to reduce the rate of spread of the virus. This measure also reduced the amount of people moving around. The UK government has had to refocus on people's health and travel patterns and has since invested heavily in building the facilities needed for cycling to better encourage people to choose cycling as a low-carbon mode of travel.

Firstly, cycling requires good cycling conditions or lanes, so the government has designated cycling lanes and placed signage so that people know exactly where to ride when they do. To encourage low-carbon travel, cycle parking is provided in public buildings. And to ensure the safety of public cycling. The implementation in London has led to a growing sense of well-being among citizens and increased the efficiency of the low carbon efforts put in.

Secondly, the government plans to try to put in electric bicycles that can help citizens to travel to locations that are a long distance away. "In order to solve the problem of citizens not knowing how to ride an electric bike, the government has also arranged training. The government also provides subsidies for the maintenance of the bikes at a later stage to protect the maintenance issues. Two out of three people in the UK are overweight, so the government has also invested in advertising to encourage people to eat low-carbon, healthy food and to cycle their way to exercise". (Surfing.com, 2020)



Fig 4: Courtesy of Peterborough City Council,2018. [Internet]

There are many other advantages to choosing to travel low carbon by e-bike. 2019 UK interviews with a subset of the population showed that around 60% or more of people choose to travel by e-bike. People have developed a dependency on cycling, they started out with the mindset of reducing their carbon footprint by commuting on an e-bike, but have since found that riding an e-bike is great fun. It is a great way to avoid the traffic jams associated with commuting and to keep fit and prevent obesity-related diseases.” The battery technology for e-bikes is also improving, so there's no need to worry about range. The government also carried out calculations comparing cars and e-bikes, based on factors such as time spent, carbon emissions and risk assessment. The cost of a car was found to be much higher than an e-bike, so the UK government has since been actively promoting it in different cities. Many companies in the UK have since chosen to commute by e-bike in exchange for £ rewards for low carbon emissions. Employees are also very active in low carbon travel schemes”. (Sohu News Network, 2019)

If you are using an electric bike for commercial purposes or if you want to transport some necessities, obviously an electric bike will not meet your needs. For example, if you want to transport vegetables and fruit or other items, you may choose to use an electric cargo bike. In an effort to reduce carbon emissions, Amazon.com has launched electric cargo bikes in the UK to replace the pollution caused by fuel trucks on the roads. The electric cargo bike is mainly battery powered and is relatively easy to drive, requiring only the same skills as riding an electric bike. Although it can only reach a speed of 20 km/h, it can cope with the task of transporting goods within the city. The hydraulic disc braking system also provides a high level of safety for those driving electric cargo bikes. According to UK government forecasts, the use of electric cargo bikes will increase, especially with the current relatively high price of petrol. The purchase price of an electric cargo bike is around £4,000 and many companies in the UK have assisted the government in working together on grant schemes to encourage the public to purchase electric cargo bikes.” Compared to the price of a regular van, the purchase price of an electric cargo bike is much cheaper with government subsidies and most people can afford to pay this price. Many companies have also researched electric cargo bikes in depth and understand the potential they offer, and the low cost, efficiency and low carbon benefits appeal to them. Since then, the city of Oxford in the UK has announced the construction of an electric cargo bike depot to deliver courier services. Courier companies in the USA have also chosen to use electric cargo bikes, which can store large volumes of goods in their boots for efficient courier deliveries. Low carbon emissions and reduced traffic stress have been achieved”. (Tencent website, 2022)

The UK government is actively promoting research into electric vehicles in order to better encourage people to travel in a low-carbon way. Surveys show that sales of petrol cars in the UK are on a steep decline and sales of electric cars continue to rise. It is expected that in the future electric vehicles will replace conventional petrol vehicles. The UK needs to continue to reduce CO₂ emissions from cars in order to protect national security and the survival of people. In order to promote the use of electric vehicles in the UK, a three-phase approach has been adopted to improve the implementation of the Low Carbon Mobility Plan. Firstly, the first stage is to provide incentives and reduced taxes for the purchase of electric vehicles in accordance with UK legislation. Then, in the second stage, the UK set up an electric vehicle research institute and improved the institutions that regulate the use of electric vehicles. "This will help to promote electric vehicles better and truly achieve the Zero Emission Plan. The UK is increasing investment in electric vehicle charging facilities in Phase 3 to make it easier for the public to travel and stop worrying about the range of driving electric vehicles on the road." (Hu, 2016).

"In terms of urban planning, in order for people to reduce the hassle of traffic congestion and accelerate the reduction of car emissions, the UK plans to create low and ultra-low emission zones for cars in London to further encourage the use of low-carbon emission, low-pollution vehicles". (Chen,2014)

The government is also setting up emissions testing machines on key roads so that people will have to drive electric cars or be fined for exceeding emissions limits. The probability is that the reason most people choose electric vehicles is to save money.

According to detailed calculations electric cars cost less money than conventional petrol cars. Most people have charging facilities installed at home, which saves them even more money compared to those provided by commercial companies. For example, a full charge of an electric car at home will only cost around £4 and will give you a range of around 200 kilometres. If you need to install a charging facility at home, you will need to purchase your own charger for your electric car, but thankfully the cost of installing a charging facility is completely free. So you don't have to worry about how to install the charging facilities, a professional staff will come to your home to help you with the installation after you have purchased the charging facilities. "The companies involved then continue to improve the safety of the charging facilities and reduce the charging time, saving people waiting time when charging their electric cars. When you leave your electric car at the charging point and you need to be busy with other things, don't worry, the charging facility can be connected to your mobile phone. Simply download the required software on your mobile phone and you can easily watch how much your electric car has charged or some important data about your electric car, such as battery life and charging costs. This makes it easier for people to know when their electric car is in need of servicing". (Nordlund,2003)

The power system of the car is still extremely important, because the power of conventional electric cars cannot meet the off-road hobbyists, when encountering large slopes on the road or bad road conditions the advantages of the power system will need to be brought into play. This is why the use of plug-in hybrids was later promoted in the UK around 2017." Plug-in hybrids offer high power and a long range.

Plug-in hybrids use electricity and an internal combustion engine together to give the

car an adequate powertrain. The power of plug-in hybrids is guaranteed and fuel costs are saved. If the plug-in hybrid runs out of electricity while driving, the internal combustion engine can remain on to power the plug-in hybrid, so there is no need to worry about running out of electricity and not being able to drive the plug-in hybrid”.

(Vico.com, 2022)

The most encountered buses nowadays are not traditional petrol buses, and in order to reduce the city's carbon footprint, the UK started introducing electric buses into urban use around 2015. To provide convenience to the public, China's BYD's UK vehicle manufacturing branch has joined forces with British bus manufacturer Alexander Dennis (ADL) to build zero-emission electric buses. This also guarantees the input of sustainable transport in the UK. Electric buses are also less expensive to charge and maintain than conventional buses, so the cost of travel for the public is also lower than conventional buses, saving them money on rides. Electric buses have an excellent braking system that allows for smooth emergency braking in the event of an unexpected situation while driving, which is also very good at protecting the safety of the driver and passengers, giving passengers a good riding experience and increasing their sense of well-being. “The electric bus has a fixed driving range and the driver can know exactly how much more range the electric bus can have to charge the electric bus. The battery capacity of the electric bus is very large, so the range is very long when fully charged, so the driver also rules out the difficulty of having a short range. The public also has less time to wait for the electric bus”. (Tencent News, 2021)



Fig 5: Electric Vehicles - Courtesy of Nottingham City Council , 2020 (Internet)

When we drive a vehicle, such as an electric or plug-in hybrid, we need to plan our driving. It is also important to develop good driving habits, for example, and electric or plug-in hybrid cars have at least three driving modes to suit your driving in different places such as eco, off-road and sport. When we drive on normal roads we can choose the energy saving mode, which saves more electricity. When driving on bad roads we can choose the off-road mode to maximise the power of the electric or plug-in hybrid vehicle. When we are on the motorway and you want to go faster and find the thrill you can choose Sport mode. It is important to emphasise that the Sport and Off-Road modes are a drain on the battery and range, so in everyday life we only need to select the Energy Saving mode to meet our driving needs. "After continuous research and upgrading by professional technicians, the battery safety technology of electric or plug-in hybrid cars is becoming more and more advanced, and after continuous high-temperature experiments on the battery, it is now possible to ensure that the battery

is resistant to high temperatures or water. The size of the battery of an electric or plug-in hybrid car is also shrinking, but don't worry, the capacity of the battery has become higher, so that the driver has a better driving experience when driving an electric or plug-in hybrid car". (De Groot,2010)

There are many electric car manufacturers today and Tesla is one of the more established and safe electric car manufacturers in terms of driving experience, price and safety. Tesla's designs are also very interesting and innovative. Through the Tesla website you can customise your own electric car and there are many options for customisation, for example the Tesla Electric has two types in terms of power, a rear wheel drive version and a dual motor all wheel drive version, most people should go for the dual motor all wheel drive as good power can be achieved. You don't have to worry about power when you're driving a Tesla EV on bad roads. The other two types of two-motor all-wheel drive versions are the long-range and the high-performance versions, which have different top speeds - the long-range version can reach a top speed of around 217 km/h, while the high-performance version can reach a top speed of around 250 km/h. As the Tesla EV is purely electric, the UK government is in favour of promoting people to buy a Tesla EV, so it meets the zero emissions requirement. If you need to carry a lot of things on your normal commute, such as documents or a trip to the supermarket at the end of the day, you can easily put them in the boot of the Tesla EV. "The Tesla Y has a very large trunk, which attracts many people to the car and is one of the highest selling cars. When you get tired at work, you can put the rear seats down and rest in the trunk of the Tesla Model Y. The boot of the Tesla Model Y can even accommodate two people. The premise is that you need to be on your lunch

break. If you're an outdoor adventure enthusiast, you can definitely drive the Tesla Model Y outdoors and then sleep in the boot, which can save you a lot of money on things like staying in hotels. This is also a good option for you". (Official Tesla website)

There are many reasons for the success of Tesla electric cars, but the biggest reason cannot be separated from the Tesla electric car commercials. The Tesla Electric Cars advert is very interesting, in 2018, the owner of Tesla Electric Cars, Musk, drove a rocket into space in the Tesla Electric Super Car, the video was broadcast on YouTube and had over 1 million views in a very short period of time. It should be noted that this is still a great advertising effect that Tesla Electric Motors has achieved without deliberately investing advertising money into YouTube, so to speak. This has also attracted many customers to buy Tesla electric cars. Sales are also getting higher. However, the Tesla Electric Car Manufacturing Company believes that the best advertising effect is to improve the performance and quality of the Tesla Electric Car and to gain more customer acceptance. Tesla Electric has done a lot of research into the driving experience, for example, the Tesla Electric's Intelligent Assisted Driving technology is a very advanced technology. "Tesla EV can drive itself on the road, and only Tesla EVs have this technology in the world. Why not get a Tesla EV and experience this high-tech feature when you can turn on the Autopilot function when you are sore from a commute or a long drive? Of course, there are downsides to Tesla's Autopilot technology. For example, when you activate the Autopilot function in a Tesla EV, you don't really get rid of the steering wheel, you need to monitor the Autopilot of the Tesla EV, hold the steering wheel with both hands and then drive automatically". (Know.com, 2020)



Fig 6: Courtesy of the Greater Nottingham Partnership 2009 (Internet)

To better encourage people to choose low carbon travel options, the UK government plans to implement a bike sharing scheme. This way you can travel low carbon and spend money on using a shared bike without buying one. All you need to do is download the bike-sharing software before you travel and you can see where the bikes are available on the software. One mobile phone number can rent four shared bikes at the same time, which also meets the needs of when travelling with your own family. When you arrive at your destination you can park your bike at a special parking spot set up for shared bikes, which is very convenient. The UK government is currently putting in shared bikes in areas such as Swansea and London to provide access to low carbon travel for the public. The cost of using a shared bike is also very low, as it is free for up to 30 minutes and £2 per 30 minutes beyond that. When you travel short distances, for example to get groceries or to the supermarket you can ride a shared bike, which also saves on the cost of petrol for your car. If you want to have fun and

enjoy the thrill of scooters, the UK government has also put in place shared electric scooters in London to give you access to them. "You can enjoy the fun and excitement with your partner and you're sure to love the shared electric scooters. For more people to use low-carbon transport, shared bikes and shared electric scooters. The UK government has also introduced a subsidy policy where the longer you ride shared e-scooters and shared bikes the greater the discount. You can also open a membership to ride shared e-scooters and shared bikes on the software for even more discounts. Go and enjoy the benefits of ride sharing e-scooters and bike sharing". (Baidu.com, 2022)

If you choose to share a bike or scooter for low-carbon travel purposes, you may be concerned that the bike-sharing or scooter-sharing parking facilities will be in a remote location. Please don't worry, the bike-sharing or scooter-sharing parking facilities are usually located next to a train or metro station. When your commute is far away, you can first choose to ride a shared bike or scooter to a metro station and then take the metro to your commute. This saves you money on the journey. You're contributing to the city's low-carbon plan and you're also getting to your commute efficiently, which is a very attractive advantage.

When we buy a car, it still costs a lot to maintain it, such as changing the car's engine oil or replacing the battery in an electric car. This is why the car manufacturing companies involved are promoting shared electric cars for public use. Electric cars are powered by electricity, so they are in line with the government's low carbon policy and

you don't have to worry about being fined for driving a shared electric car. When driving a shared electric car, you don't have to pay for repairs, insurance or car washes. Driving a shared electric car is also good for the environment. The hardest part of driving a car is finding an empty parking space on the road, but with shared electric cars you don't need to find an empty parking space, there are dedicated return facilities. This also helps take the hassle out of finding an empty space and saves you the hassle of paying for parking. However, I think there is an issue that needs to be addressed by the manufacturing companies. "For example, shared electric cars are produced in a uniform way, with the same appearance or performance options, and do not meet the needs of all people who want to drive shared electric cars. If there were more options in terms of appearance and performance, more and more people would choose to drive shared electric cars". (Tencent, 2019)

The UK Government launched the Shared Electric Vehicle Club in London in 2013 to complete its low carbon travel plans. The UK government teamed up with car manufacturers to launch the Car Sharing Club membership service, where you pay a one-off membership fee of around £40 to enjoy the low cost of hiring a shared electric car. You also don't need to pay for transport or electricity to drive a shared electric car, and the service has seen a large number of people join the Shared Electric Car Club since its launch. "This will also help improve the air quality and environment of the city, as well as reducing the environmental damage caused by people driving cars. If you are a university student you can also choose to drive a shared electric car, after all the benefits of membership of the shared electric car club are very university friendly. The introduction of this scheme by the UK

government has also improved the quality of life of the public and is in line with plans to encourage low carbon travel, which is a double benefit". (electric.com, 2016)

Conclusion

In this day and age when cities need our protection, we should do what we can to help the places we live in. Firstly for example when we buy a car we can choose a low carbon electric car, especially in a time when petrol prices are getting higher and petrol is in short supply, and also protect the environment. Travelling short distances such as grocery shopping or household items can be done by bicycle or e-bike, which can help you to exercise and avoid obesity-related diseases and save the cost of driving. Not only do we need to choose environmentally friendly means of transport when travelling, but we also need to use low-powered appliances or solar-powered facilities to reduce our carbon footprint. Hopefully, as we continue our efforts, the urban environment in which we live will become better and better.

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