



# The Case for a UK Incentive for E-bikes

Paper 2 in a series to develop the evidence base on the contribution of the bicycle industry to Britain's industrial strategy

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*transport for quality of life*



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## Foreword

Electric bikes can transform our cities, and our lives. This is the clear evidence from Europe.

In the Netherlands, Belgium and Austria, e-bikes now account for 30% of all bicycles sold annually; and for 10-20% of all sales in Italy, France, Sweden and Germany.

In Sweden, in the last year alone, e-bike sales increased by 53% (from 67,500 to 103,000), and in France their growth was 90% (from 134,000 to 255,000). Across Europe, sales of e-bikes are far higher than those of any other electric vehicle, including all hybrid and all-electric cars and vans combined. This significant growth is important and encouraging, because e-bikes lessen our reliance on cars.

This Evidence Review by Transport for Quality of Life indicates that about half of all trips by e-bike substitute a journey that otherwise would have been by car; in consequence they are highly effective in the reduction of carbon, of pollution and congestion. Furthermore e-bikes are used for longer trips than conventional pedal cycles, so their beneficial contribution is correspondingly more, and at the same time they help us to travel more healthily.

But this trend in the adoption of e-bikes is not reflected in the UK. Here they account for only 3% (60,779 in 2018) of all bicycle sales. Why? The reason is not hard to find:

In Europe, consumer awareness and interest in buying an e-bike has been boosted through a straightforward financial incentive, offered nationally, or by local or regional authorities. No such scheme exists in Britain.

The U.K does have a specific 'Cycle to Work scheme', and recently this has been enhanced to enable employees to buy an e-bike at a discount, provided that it is used for commuting to work. This is welcome, but it is limited. It is available only to those in work, whose employer registers with the scheme, and whose main use is for daily travel to their workplace. It is not available to those who are self-employed, mature students, job-seekers or to retired people; it also excludes people new to cycling, or who do not wish to go to work by bike.

This Evidence Review amply demonstrates the case for the introduction of a U.K e-bike purchase incentive scheme open to all, for a limited period, in order to bring about the change in Britain that has already taken place in Europe.

Without the stimulus of a national incentive, this necessary and urgent change to our travel habits would, at best, occur only very gradually; with it, we can unite the influence and impact of both government and industry. The cost per purchase would be less than one tenth of the grant for electric cars, and would also be a more efficient way of reducing carbon emissions.

By raising awareness, and by encouraging the purchase of e-bikes, the grant scheme would serve to reduce congestion on our roads, and at the same time provide real benefit to the nation's health.

Based on this international evidence, the Bicycle Association is affirming its commitment to working with the government, and with city regions, to realise the potential of e-bikes, and to helping in the transformation of everyday travel in towns and cities across the nation.

Steve Garidis  
Executive Director, Bicycle Association of Great Britain

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## Top line

Incentive schemes to encourage the purchase of electric bikes are widespread in Europe. They have been highly effective in stimulating the growth of e-bike use, and should be adopted in the UK too.

## Executive Summary

Numerous evaluations demonstrate that e-bikes support physical activity. They have broader appeal than conventional bikes, including to older people, women, and those who are less active, as well as to the young, men and the physically active.

Sales of e-bikes in Belgium and the Netherlands are 20 times greater, per head of population, than they are in Britain. Sales in Sweden, Germany and Austria are between 7 and 14 times higher per head of population than in Britain.

A main reason for the greater popularity of e-bikes in these countries is that national and regional or local governments have offered grants to incentivise purchase of e-bikes. These grants have raised awareness of e-bikes as an option.

Evaluation of e-bike grant schemes in various countries found that typically, around half (40-60%) of e-bike trips replaced car trips, although the proportion can be as low as 16% or as high as 70% depending on local conditions and previous travel patterns.

Results from individual countries showed that:

- About 40% of those who received a grant to buy an e-bike subsequently reduced their car use for commuting, shopping and leisure trips (Austria).
- People who received a grant increased the distance they cycled from an average of 200km per year before buying an e-bike to 1,400km per year afterwards, and reduced the distance they travelled by car by 660km per year (France).
- Sales of e-bikes in Sweden jumped from 12% to 19% of all bike sales in a single year (from 2016/17 to 2017/18), and this was attributed to the national grants programme.

E-bikes are used for longer journeys than conventional bikes, and therefore have significant potential to reduce carbon emissions from transport. An e-bike grant scheme would be more than twice as effective, per pound spent, as the current grants offered to buyers of some electric cars: for example, over five years the

cost per kg of CO<sub>2</sub> saved by an e-bike grant scheme would be 42 pence, compared to 88 pence per kg of CO<sub>2</sub> saved by an electric car grant used to buy a Tesla Model S.

Experience in other countries suggests how an e-bike grant scheme should be administered in Britain:

#### National and local

- A national grant scheme should be offered by the Office for Low Emission Vehicles, which already provides grants for purchase of electric cars
- Local authorities should offer grants too, enabling experimentation with different approaches
- Grants of about £250 per e-bike are effective.

#### Keep it simple

- Grants should be offered via retailers at point of sale, using an on-line portal to check validity: one e-bike per person.

#### Partnerships with retailers

- The Bicycle Association could work with government to negotiate matched funding deals with the bicycle industry. For example, in Guernsey the government contributed 20% of the grant and the bicycle industry contributed 5%.

#### Run as a 'campaign'

- In France, schemes that were run as a 'campaign' in several waves, each of about 6 months, with fresh promotion each time, were the most effective.

#### Try before you buy

- Some areas should experiment with offering the chance to 'try before you buy' – e.g. one-year rental after which the e-bike can be bought at a discount.

## 1. Introduction

The UK government offers substantial grants to car dealerships and manufacturers to reduce the price of buying ultra low-emission vehicles. The grant pays 35% of the purchase price on eligible cars with CO<sub>2</sub> emissions of less than 50g/km and a zero emission range of at least 70 miles, up to a maximum of £3,500. Grants are also available for eligible low-emission motorcycles and mopeds, vans and taxis. In September 2018 the government announced funding of £2m to support the uptake of e-cargo bikes, and in June 2019 the Cycle to Work salary sacrifice scheme was extended to include electrically assisted bicycles for commuting. There remains however no equivalent to the grant schemes that are common elsewhere in Europe for two-wheeler electrically assisted bikes for personal use.

Electrically assisted bikes – referred to throughout this paper as e-bikes – are ones where the rider pedals but can gain extra momentum from battery power, reducing the effort needed. Speeds are limited by European legislation to 25kmph (15.5mph) and when pedalling stops or this speed is exceeded, assistance cuts out.

Across Europe there is growing experience of the use of e-bikes, their effects on personal travel and the impact of incentivizing e-bike purchase through programmes at local, regional and national level. This paper brings together findings from a wide range of practical interventions, including recent large-scale subsidy schemes in France and Sweden, to consider the benefits that a national UK subsidy for e-bike purchase could offer.

## 2. Promoting active travel, health and wellbeing

Although riding an e-bike requires less effort than riding a conventional bicycle, there are several reasons why access to one can be positive for health and wellbeing with potential to maintain or increase levels of active travel for individual users.

First, despite the electrical assistance that e-bikes provide, e-cycling involves significant levels of exertion. Researchers examining the impact on heart rate and oxygen consumption on a fixed route have found, even on the highest power-setting, participants engage in physical activity of at least moderate intensity.<sup>1 2</sup> A recent US study found e-bikes provided moderate physical activity on flat segments and downhill segments and vigorous physical activity on uphill segments.<sup>3</sup> Energy expenditure and oxygen consumption per mile were about 24% lower for e-bikes than for conventional bikes (reflecting the shorter travel time rather than the intensity of the activity). A Swiss study<sup>4</sup> which assessed the health impacts for overweight volunteers undertaking a programme of regular cycling using e-bikes and conventional bikes over a specified distance, concluded that those travelling by e-bike gained comparable health benefits from their efforts to those cycling conventionally. The e-bike participants travelled faster and more uphill.

Secondly, evaluations have shown that in the context of every day travel, e-cyclists tend to cover greater distances than conventional cyclists. Cairns et al. (2017), in a review<sup>5</sup> of European research, found estimates of weekly travel by e-bike users ranged from 15 to 75km a week. A survey of commuters in the Netherlands, including 28 e-bike users, reported that on average e-cyclists made trips of 9.8km as against the 6.3km of conventional bike commuters.<sup>6</sup> German research<sup>7</sup>, conducted in four regions and including 70 existing e-bike

users, found that the average e-bike trip was 11.4km as against 7.1km by conventional bike. This suggests that where riders transfer from a conventional bicycle to an e-bike, their behaviour in some measure compensates for the lower exertion. They may still engage in comparable and potentially higher levels of activity because e-bikes enable them to make longer trips in hillier conditions.

Thirdly, in practice, many of those who take up e-cycling do so to overcome perceived barriers to conventional cycling that would otherwise make them less willing to use a bike. E-bikes have a particular appeal to older riders. In the Netherlands, where e-bike use is relatively well established, 81% of e-bike kilometres in 2016 were ridden by those aged 50 or over (though use by younger age groups is growing).<sup>8</sup> In the UK, surveys of 470 participants in a variety of small pilot schemes to provide shared e-bikes, with funding from the Department for Transport, found one in three e-bike riders had rarely or never cycled before taking part in the scheme.<sup>9</sup> Respondents' most common reasons for using an e-bike were that it gave them exercise (37%) and gave them a more enjoyable journey (34%). Over a quarter of the projects' regular e-bike riders reported that they had previously struggled to use a conventional bike for fitness or health reasons. The researchers conclude that e-bikes offer a way into more active travel for reluctant cyclists, with benefits for health and social inclusion. The pilot projects attracted high interest from riders in middle and older age groups, with strong representation among those between 35 and 64. They also succeeded in engaging women, who made up 45% of e-bike users, though accounting for only 25% of all cycling trips nationally. Among the project's regular e-bike users, 58% reported feeling happier and 41% feeling healthier when using an e-bike.

Finally, as outlined below, it has been demonstrated in a wide range of contexts that a proportion of trips made by e-bike users would previously have been made not by conventional bike but by car, indicating not just an increase in active travel but a reduction in emissions.

### 3. Reducing car use

Cairns et al. (2017), reviewing European research from Austria, France, Germany, Italy, the Netherlands, Norway, Sweden, and the UK, alongside results from a UK trial, conclude that when people have the opportunity to use an e-bike a proportion of distance travelled will replace car mileage. Those studies quantifying the percentage of e-bike trips that were formerly car trips reported substantial reductions:

- In Graz, Austria, when 20 people aged 40 to 70 were lent e-bikes for a week about 50% of the e-bike trips replaced a car trip, amounting to an average of six trips a week for each participant.<sup>10</sup>
- In Germany surveys of 70 existing e-bike users and 312 trial participants found that 41% of all e-bike trips and 62% of e-bike commuter trips were previously made by car.<sup>11</sup>
- In the Netherlands a survey of 1,448 commuters, including 28 e-bike commuters found 16% of trips were a substitute for car trips.<sup>12</sup>
- In Sweden, a survey of 321 e-bike purchasers found 47-67% of e-bike journeys replaced a car trip.<sup>13</sup>

- In Totnes in the UK, where a community scheme offered 10 e-bikes for hire, 40-70% of e-bike journeys replaced car journeys.<sup>14</sup>
- In Brighton in the UK, borrowing an e-bike for commuting led to a 20% reduction in car miles.

The considerable variations seen here are likely to reflect local conditions and initial travel patterns.<sup>15</sup> The Brighton study found that overall the average amount of time spent actively travelling showed no change, mainly because increases in time cycling were counterbalanced by decreases in time walking, in an area with relatively low levels of driving and high levels of walking.

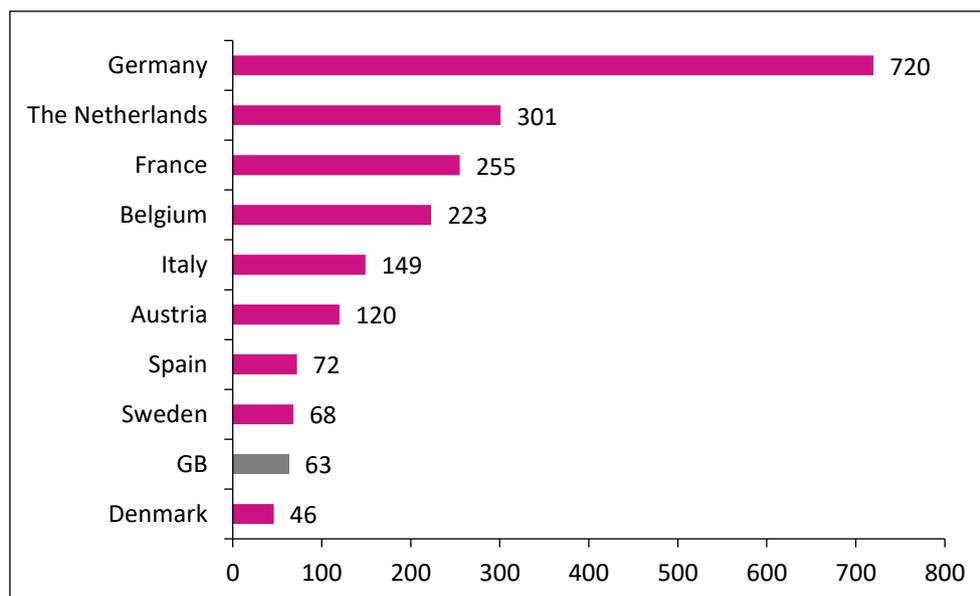
Recent analysis from the Netherlands suggests that among e-bike users, 43% report a decline in their car use, with some declines in public transport use and very small declines in walking.<sup>16</sup> (As might be expected in a country with high levels of conventional cycling, around three-quarters report a decline in their use of a conventional bicycle.)

The remarkable potential of e-bikes to replace a proportion of car trips, while maintaining or increasing physical activity levels for many of their users, gives them a critical role to play in the future of towns and cities. In several European countries support for e-bike purchase is now viewed as a valuable policy tool for reducing air pollution, traffic congestion and carbon emissions, with additional benefits for social inclusion. Experience from these schemes, described in this paper, offers further evidence for the value of these incentives in achieving modal shift, while also supporting active travel.

#### 4. The rise of e-bikes in Europe

European sales of e-bikes have risen year on year across a decade. Figure 1 below shows e-bike sales in the 10 European countries with the highest volume of sales in 2017. Germany, the Netherlands and France accounted for the largest share of the European market – 35%, 14% and 12% respectively.

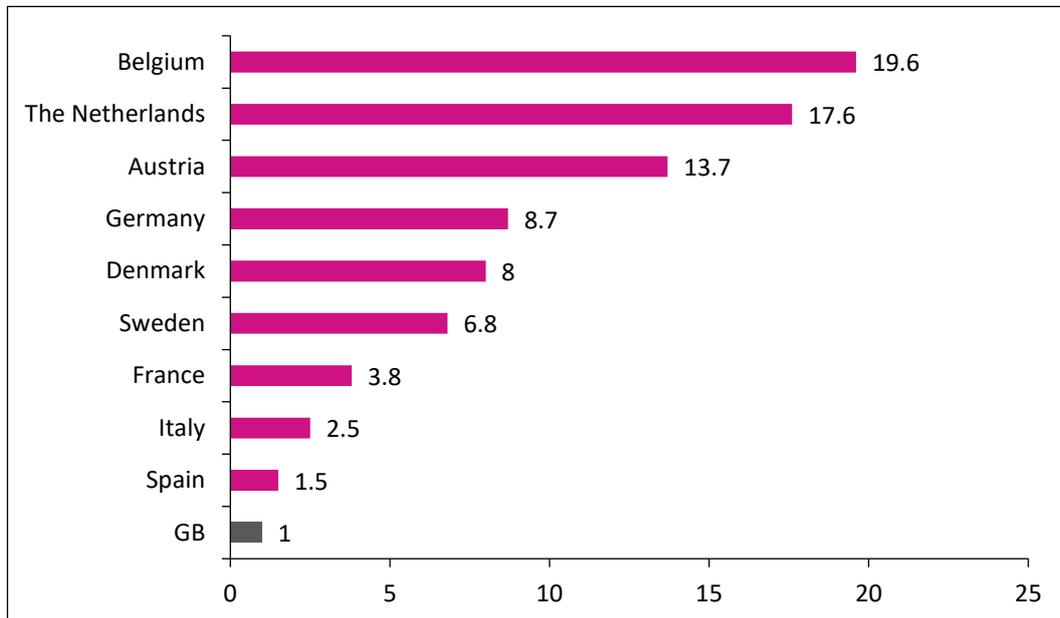
**Figure 1: Sales of e-bikes (x 1,000) in 2017 in 10 European countries**



Analysis based on sales figures from the Confederation of the European Bicycle Industry.

Relative to population however, as shown in Figure 2, Belgium had the highest level of sales, selling 19.6 e-bikes per 1,000 people. Great Britain, while accounting for 3% of European sales, sold only around one e-bike per 1,000 people.

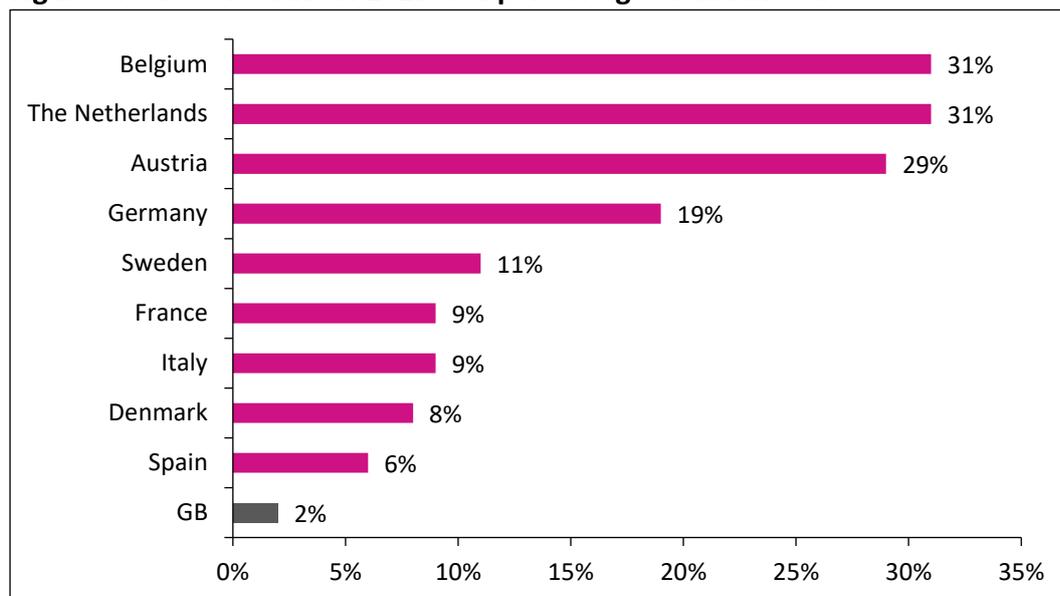
**Figure 2: Sales of e-bikes in 2017 per 1,000 head of population**



Analysis based on sales figures from the Confederation of the European Bicycle Industry and population figures from Eurostat with Great Britain figure from Office of National Statistics.

E-bike sales as a percentage of all bike sales (shown in Figure 3) are especially high in both Belgium and the Netherlands, at 31%, closely followed by Austria (29%) and Germany (19%). In Great Britain e-bikes currently represent a much smaller share of the total bicycle market at just 2%.

**Figure 3: Sales of e-bike in 2017 as a percentage of all bike sales**



Analysis based on sales figures from the Confederation of the European Bicycle Industry.

## 5. E-bikes and road safety

There has been some discussion about e-bikes and road safety, following reports that, over the last 10 years, the Netherlands has seen a rise in the mortality rates among cyclists from incidents not involving motor vehicles. A 2017 Dutch study concluded that an electric bicycle in itself is no more dangerous than a conventional bicycle, and that an increase in the number of road casualties among e-cyclists could mainly be attributed to the increase in the number of older cyclists, as a group more at risk from traffic danger generally and more vulnerable in the event of a casualty.<sup>17</sup> Older men particularly appear over-represented in recent Dutch casualty figures for e-bikes.<sup>18</sup> Commentators in the Netherlands have suggested that new electric bike users could benefit from training and from bicycle designs that enable the cyclists to sit on the saddle with their feet on the ground, as well as further expansion in safe infrastructure important for all cycling, including wider cycle lanes to accommodate greater use.<sup>19</sup>

Risks have to be set against the substantial benefits of cycling in helping to reduce the incidence of health problems such as diabetes, cardiovascular disease, some forms of cancer, depression and obesity,<sup>20 21 22 23</sup> benefits that are expected to be greatest for those who were previously more sedentary.

## 6. European experience of e-bike incentives

A growing number of European countries have run schemes to provide grants for e-bike purchase. The European Cyclists' Federation in 2016 identified subsidy schemes at regional or local level in Austria, Belgium, France, Germany, Italy, the Netherlands and Spain. National schemes had been introduced in Austria, Italy, the Netherlands and Spain, though those in Italy and the Netherlands had come to an end.<sup>24</sup> In the Netherlands subsidies were offered as part of the first phase of a national programme for congestion reduction. In Italy a 2009 subsidy scheme offered 30% of the purchase price for bikes or e-bikes up to ceiling of €700. With a total budget of €19m it is reported to have resulted in the sale of an extra 127,000 bicycles/e-bikes.<sup>25</sup> While this national incentive was discontinued in 2014, many municipalities continued to offer discounts for individuals buying e-bikes.<sup>26</sup> The Spanish government offers discounts as part of its annual subsidy schemes for low-emission vehicles. In 2014 for example it budgeted €0.5m to give discounts of €200 for e-bikes.<sup>27</sup> Both France and Sweden launched national schemes of their own in 2018, with Sweden drawing particularly on experience in Oslo. In the UK, the Scottish government has instigated a new grant scheme to encourage e-bike use. E-bike incentives have also been introduced in the Channel Islands. Evaluations from several schemes are described below.

### 6.1 Austria

In Austria, grants available at national level in 2018 offer €100 for electric bikes, €250 for electric cargo bikes and €200 for cargo bikes.<sup>28</sup> The retailer is expected to match the grant with a discount of the same amount. The grants – decided on an annual basis – are accessible to private enterprises, not-for-profit and religious organisations and local authorities, though not private individuals. Government incentives have helped to build the e-bike market over the last decade and there have also been numerous incentive schemes that operated locally.

In Vienna alone an incentive scheme subsidized 2,540 e-bikes in 2010.<sup>29</sup> From 2009-2011 more than 20,000 Austrian households received funding for electric vehicles, in most cases for e-bikes.<sup>30</sup>

Promotion of electric bicycles is one of 24 measures in the 2015-25 Austrian Cycling Masterplan.<sup>31</sup> Supported purchases are listed alongside a raft of other actions to encourage e-bike use, including an increase in theft-proof parking facilities, establishment of a technical standard for e-bike components, initiating a nation-wide repair network, greater density in charging stations and promotion of electric bicycle hire systems at train stations. In an evaluation of the earlier phase of the Cycling Masterplan, a stakeholder survey showed that initiatives to promote electric bicycles were considered to be among the most successful in the plan. A separate measure focuses on promotion of passenger and goods transport by bicycle, including e-bikes and e-cargo bikes. The cycling mode share in Austria was 7% in 2010, and the Cycling Masterplan aims to increase this to 13% by 2025. The Masterplan comments that with the electric bike promotion scheme for companies and municipalities, Klimaaktiv Mobil – the Austrian action plan for mobility management – has made an important contribution to the electric bike boom in Austria.

In 2009 the 'Landrad' project in Vorarlberg, Austria provided subsidies for e-bike purchase to 342 people and for 158 e-bikes at 93 organisations. Evaluation of feedback from 196 individuals found that 52% of the trips made by e-bike were previously made by conventional bike while 35% were made as a car driver. Substantial and long term changes to travel behaviour were reported for 21% of purchasers.<sup>32</sup>

In 2012 the characteristics and travel behaviour of 1,398 people across Austria who had received subsidies for an e-bike were evaluated through a postal survey.<sup>33</sup> Purchase was supported with a payment of €150-300 refunding 15% of the total cost on average. Reductions in car use were reported by 37% of respondents for work trips, 40% for shopping trips and 40% for leisure trips. Men accounted for 59% and women for 41% of the sample. The research found a very high prevalence of older age groups. Approximately 90% were aged 46 or over, and 62% were over 60. Accordingly only 43% undertook regular trips for work and education while almost all made regular shopping and leisure trips. Lower income groups predominated though the number in households without a car was lower than average. By comparing the respondents' travel habits with those of the wider Austrian population the authors argue that, contrary to the indications of the respondents themselves, the only substantial impact on car use was in leisure travel. However, given the age of the respondents this does not seem an appropriate comparison for assessing before and after change. As the authors also point out, the age profile of respondents may have been skewed by the use of a postal survey.

## 6.2 France

In France, in February 2017 the Environment Minister Ségolène Royal outlined a €200 state subsidy for buying selected electrically assisted bicycles.<sup>34</sup> Buyers were not permitted to sell on the bike within a year of purchase and the incentive could only be paid once to each person. The offer was time limited to January 31, 2018. The incentive was welcomed by the French club of cycling towns,<sup>35</sup> which championed the benefits for French manufacturing, accounting for 40% of the French e-bike market.

For 2018 the French government revised the conditions for support. The new regime required that recipients had made no income tax contribution in the previous year and that the grant be matched by a grant from the local authority. The total received from both grants could not be greater than 20% of the acquisition cost or exceed €200.<sup>36</sup> The French federation of bicycle users (La FUB) responded that under these conditions almost no one would benefit from the bonus, while the French club of cycling towns criticized the geographical inequalities the conditions created, since major cities could better afford to match the grant, though residents in smaller towns and suburbs could benefit from being able to make longer trips.

Renewed support for e-bikes is promised however in the French government's new Cycling Masterplan,<sup>37</sup> unveiled in September 2018. This includes the creation of a national cycling fund, including €350m over seven years for the support of cycle path networks, a strategy to combat cycle theft and cycling education in primary schools. The plan promises support for the purchase of electric bicycles, including cargo bikes, as part of a programme of energy saving certification. Other measures include tax incentives to allow companies to offer employees a tax-free sustainable mobility package of up to €400 a year (currently going through the legislative process). From 2020, all public bodies will provide a sustainable mobility package of €200 per year to their employees.

Incentives for e-bike purchase also feature in Parisian initiatives to ease congestion and lower pollution. In March 2018,<sup>38</sup> residents purchasing an e-bike or upgrading a conventional bike with an electrical assist could benefit from a subsidy of up to €400, with €600 available to those purchasing electrical or conventional cargo bikes. The scheme included €600 for residents getting rid of a personal car and €50 credit to join the city's bike share programme for new drivers applying for a driving licence. Many earlier schemes to subsidize e-bike purchase have been run in Paris and in other areas of France.

Pro-cycling groups making the case for the renewal of economic incentives nationally, point to the results of a 2016 evaluation by ADEME.<sup>39 40</sup> This study identified around 36 purchasing schemes across France, frequently capped at €250 and providing a subsidy of around 25%. Most schemes were for electrically assisted bikes, though some areas subsidized conventional bicycles, folding bicycles and cargo bikes. The researchers observe that schemes tend to be more effective if run as a campaign, with fresh promotion to renew the initiative. ADEME's survey of grant recipients was conducted in Autumn 2015 and received 380 responses, of which 91% related to grants for power-assisted bicycles. Responses came largely from recipients in the vicinity of Ile-de-France and Pays d'Aix. The survey showed car ownership was high among the beneficiaries – 43% of households had more than one motor vehicle, compared to 36% nationally, while only 7% were in households without a car, against 19% nationally. The grant led to the sale of more e-bikes and more expensive e-bikes – 31% of users said they would not have otherwise made the purchase, while 42% said they would have bought a less expensive model. The average amount spent was €1,460 - well above the average price for a power assisted bike in France of €1,000. Grants were popular with retired people (21%) and with women (58%). Two-thirds of respondents used their bicycle for home-work travel one to two times a week or more.

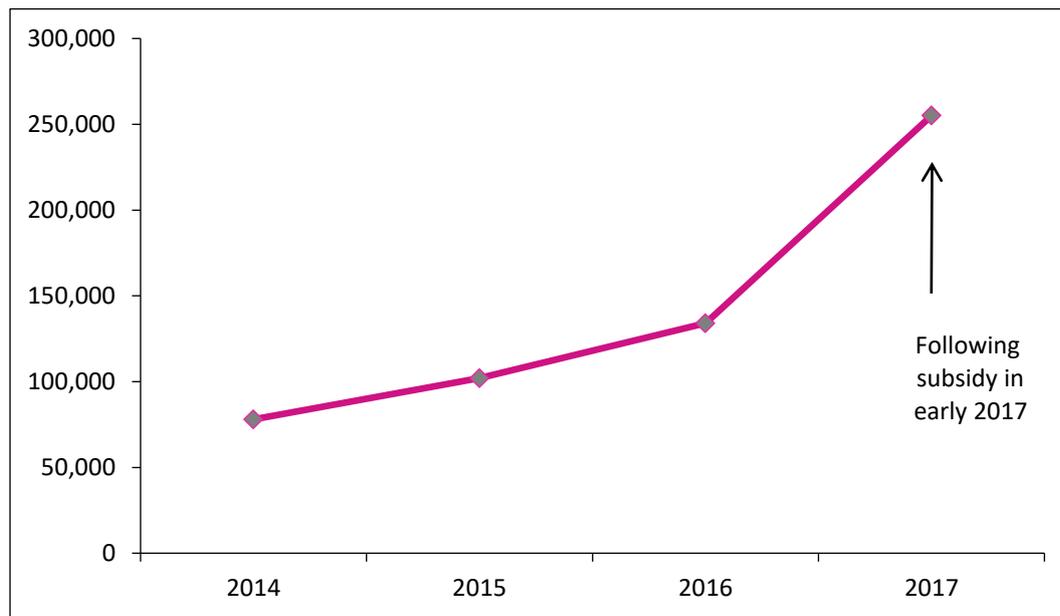
The authors calculate that grant beneficiaries travel on average 1,400km a year by e-bike, increasing their previous cycling distance by 1,200km and saving 660km by car. Hence over

five years an extra 6,000km are covered by bike and 3,300km by car avoided. A proportion of households with two cars sold the second vehicle following adoption of the e-bike (with these households reducing from 46% before purchase to 39% after purchase). The authors estimate that, taking into account reductions in all forms of motorized travel, including motorized two-wheelers, there is an average reduction of 200kg CO<sub>2</sub> a year for each beneficiary, and a saving of nearly a tonne of CO<sub>2</sub> over a five-year period of e-bike use. They conclude that the purchase grant is a highly effective investment, comparing well with other support measures in terms of cost per car km avoided and per bicycle km generated. They also point to benefits for the local economy. They suggest that, to optimize use of the grant and make it more equitable, the incentive could be made proportional to income, and distributed to more users, giving the scheme greater visibility. In addition they argue that it would be all the more effective to couple short-term rental of an e-bike with the option of a grant for purchase.

A 2017 evaluation of the French national incentive scheme by the Cerema Centre,<sup>41</sup> surveyed 22,163 of the beneficiaries whose characteristics in terms of age, sex and geographical distribution were representative of the wider group. Cerema report that, following its introduction in February 2017, the incentive had been activated 150,000 times by the end of September. They found that, although the majority of cycle trips in France are made by men, women took up the offer in almost equal numbers, making up 48% of beneficiaries. The majority of these users (68%) were aged over 55, with 21% from 46-55, 8% from 36 to 45 and 3% from 26 to 35. Some 84% of buyers used the bike for leisure, walking or hiking, while in 55% of cases it was used for travel between home and work, thought to include the voluntary activities of retirees. Some 38% used the bike for playing sports. In 61% of cases the trip made using the electric vehicle would otherwise have been made by a motorized vehicle and for 21% by conventional bike. Drivers of cars and motorized two-wheelers gave exercise and ecological motivations as the reason for transferring to an e-bike, while cyclists used to conventional cycling said they wanted to limit their efforts and travel further. The average cost of the e-bike bought by the respondents was €1,749. The authors submit that, given the high price of a good quality machine, the incentive cannot be regarded as a social measure, but are positive about the effects on CO<sub>2</sub> emissions, air pollution and active travel.

In France, as across Europe, e-bikes were rising in popularity before the arrival of the national incentive. However, as shown in Figure 4, sales show a clear uplift for 2017, following its introduction. The most recent data shows that e-bike sales have continued to boom, reaching 338,000 in 2018.<sup>42</sup>

**Figure 4: Sales of e-bikes in France 2014-2017**



Analysis based on sales figures from the Confederation of the European Bicycle Industry.

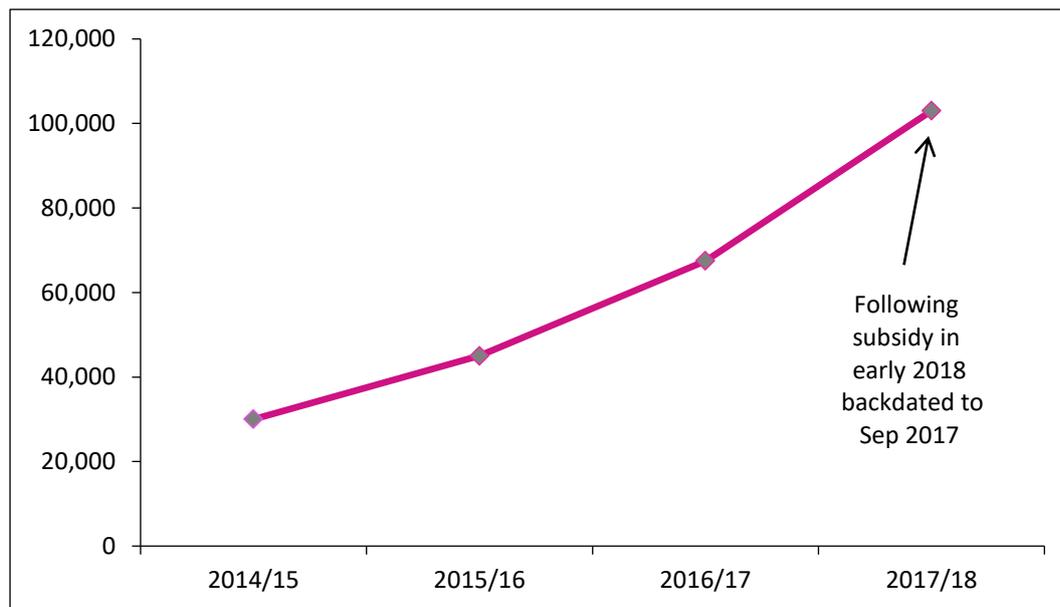
### 6.3 Sweden

In Sweden, a national grant scheme was introduced in early 2018, subsidizing purchases of electric bicycles by 25% up to maximum of 10,000 SEK (around €969).<sup>43</sup> The grant was announced in advance and could be used to cover purchases retrospectively from the September prior to its implementation – in order to avoid an anticipatory dip in sales. In late 2017 the Retailers Research Institute announced that the e-bike was Christmas present of the year. By the start of October 2018, more than 87,000 grants had been made to a total value of over 368m SEK (around €36m).<sup>44</sup> The scheme covered electric bicycles, mopeds, motorbikes and vehicles intended for people with physical impairments. Just under 92% of grants were for e-bikes, with demand spread widely across the country.

The Swedish cycling group Cykelfrämjandet lobbied hard for the subsidy, which was then adopted with pressure from Green politicians. The Social Democrat/Green coalition government allocated a budget of around €105m to fund it for three years to 2020. However politicians in opposition parties pledged to withdraw the subsidies if they got into power, and in a period of political uncertainty following the unclear outcome of the 2018 election, funding for the subsidy was discontinued. The original government motivation behind the scheme was to speed up the transition towards fossil-free urban transportation and meet sustainable development goals. An evaluation of the impact of the subsidy on travel habits suggests that the subsidy was highly effective in achieving this aim, with about half of the use of e-bikes substituting for driving a car<sup>45</sup>.

Sales of e-bikes in Sweden were rising prior to the introduction of the incentive. Figure 5 below indicates that in 2017/18, the first year of the Swedish grant scheme, sales rose more steeply. The Swedish Transport Administration reported that sales of e-bikes jumped from 12% to 19% of all bike sales in a single year (comparing 2016/17 and 2017/18), and attributed this to the grants<sup>46</sup>. Cykelbranschen, the cycling industry body, also reports that the incentive resulted in sale of better quality e-bikes.

**Figure 5: Sales of e-bikes in Sweden 2014-18**



Analysis based on sales figures supplied by the Swedish cycling industry body, Cykelbranschen. Totals show yearly sales from September to August rather than calendar year totals.

#### 6.4 Oslo

Support for the Swedish e-bike subsidy was bolstered by the positive results of a Norwegian scheme in Oslo, announced by the city authority in January 2016. Oslo residents were offered a 25% reduction in the cost of an e-bike up to a maximum value of €500,<sup>47</sup> with the aim of encouraging cycling in the city's hilly conditions, including long-distance trips. The e-bike had to be an approved model, and registered with an insurance agency and users were expected to respond to a questionnaire at the outset. The scheme was so popular that in three weeks the €0.6m set aside for it was gone and by the beginning of February no new applications were being accepted.<sup>48</sup> Oslo's cycling conditions have improved over time with 155km of cycle lanes built since 1999 and vehicle speeds reduced to 30km/h in the city centre.

A large-scale study<sup>49</sup> by the Norwegian Centre for Transport Research assessed the effects of the subsidy on 669 new e-bike owners. The researchers point out that Norwegian cycling patterns are strongly influenced by seasonal weather, so that any simple before and after assessment of travel habits would not be adequate. They therefore recruited 2,230 cyclists as a control group, of which 993 wanted to buy an e-bike. Travel was monitored using travel diaries and an app.

Among those applying for the subsidy 47% said the existence of the scheme had influenced their decision to buy a bike to a large degree, and a further 41% to a certain degree. The incentive was placed well ahead of other factors such as media or friends' recommendations, indicating that it had been successful in encouraging ownership, rather than simply financing purchases that would have taken place anyway.

As expected, all groups increased their cycling levels as the year progressed, but beneficiaries of the subsidy scheme had by far the largest increase. This group also increased their use of a bicycle relative to other forms of travel, while those in the control group who wanted an e-bike showed a relatively lower increase.

The researchers conclude that, where people replace their usual bike with an e-bike, the e-bike contributes to an increase in bicycle use by between 12 and 18km per week, implying that the e-bike subsidy can enable recipients to double the proportion of travel made by bike. Taking into account changes in car and public transport use, they estimate that future e-bike users are likely to reduce their CO<sub>2</sub> emissions in the region of 87-144kg per year. The higher figure here is derived by applying the reductions in CO<sub>2</sub>/km travelled from app data to the travel of an average Oslo resident, but in estimating a range, the authors point out that e-bike purchasers have lower daily transport needs than the average population.

In early 2017 a new scheme offered Oslo residents grants to buy electric cargo bikes<sup>50</sup> with the city paying up to 25% of the bike's cost, and the grant capped at 10,000 NOK (around €1,000). Oslo earmarked 5m NOK (around €528,000) for the project – 3m for private individuals and 2m for businesses and organizations, meaning the programme could pay for 500 to 1,000 cargo bikes.

## 6.5 The Channel Islands

Successful e-bike subsidy schemes have been run in the Channel Islands in both Jersey and Guernsey.

In Jersey<sup>51</sup> an e-bike grant scheme with funding of £150,000 was launched by the Minister for Infrastructure in June 2016 and offered a discount of up to £300 for individuals buying an e-bike through local retailers. The original intention of offering £50,000 a year for three years was outstripped by the scheme's popularity and 550 e-bike grants were issued in less than a year, a sharp rise from the previous sales figures of less than 100 a year. The Jersey government is currently considering a further e-bike scheme as part of its Government Plan for 2020-2023<sup>52</sup>.

A survey of recipients in April 2017 received 217 responses. Sixty-five per cent of users said they had bought the e-bike to lose weight or be more active/healthier and 24% to travel around more easily; 58% said the e-bike had replaced travel by car/van/scooter/motorbike; 70% said they had used their e-bikes for work at least once a week, and of those 34% for four or more days a week. When asked what benefits they had seen, 63% said they felt healthier/fitter/more active; 56% that they had more flexibility to travel around; and 50% that they had saved money on parking and petrol. One user commented that the e-bike had allowed them to be active with their children, despite chronic pain.

In Guernsey<sup>53,54</sup>, e-bike subsidies were introduced through a public-private partnership. Launched in April 2018, the scheme offered a 25% discount on purchase up to the value of £1,500. The States of Guernsey provided a 20% subsidy with retailers making up the remaining 5%. The budget of £100,000 was exhausted in less than a month with the purchase of 366 electric cycles. Bikes sold for between £650 and £3,000, attracting discounts up to £375 per bike. The initiative was part of the Integrated Transport Strategy, and aimed to establish e-cycles as a viable alternative to the car for a large section of the community. Anyone aged over 14 was eligible to take part.

A follow up survey<sup>55</sup> showed 80% of respondents had purchased the e-bike to be more active and healthier and 57% of respondents believed they were more active/healthier since using it. Over half of respondents (57%) said the e-bike had mainly replaced car journeys and 44%

said they used their e-bikes between 2-4 days a week for work. Around half of recipients (51%) said they would probably not have bought the e-bike without the subsidy and 41% that the subsidy had helped to persuade them. Anecdotally retailers report that e-bike popularity has continued to hold up after the end of the subsidy – suggesting a pump-priming effect.

There was an even split between male and female users and a prevalence of older users, with 40% aged 51-60, 25% aged 61-70 and 6.6% aged 70+. No information was collected about professional status as the initiative aimed to reduce motorized journeys, irrespective of this. Organizers recommend the inclusion of e-trikes in future initiatives, for the benefit of people with reduced mobility.

In practical terms a portal was developed which enabled retailers to input customer details at point of sale and to check whether the customer had purchased an e-bike from another local supplier – observing a restriction of one bike per person. This also enabled retailers to be aware when the subsidy was running out. Customers signing terms and conditions agreed to a free safety check at three months and survey participation. Retailers received full payment at point of sale – a safeguard against customers defaulting on the purchase.

## 6.6 Scotland

In Scotland, in June 2018 the Scottish government announced funding to encourage the use of electric bicycles, particularly for shorter journeys.<sup>56</sup>

The E-bike Grant Fund allocates funding for local authorities, public sector agencies, community organisations, colleges and universities to encourage large-scale e-bike adoption. Grants are expected to fund e-bike pools, secure cycle parking and safety equipment. Matched funding is required, with a maximum of 50% of project costs met by the fund and projects are required to agree to a monitoring process. On 2 October 2018 it was announced<sup>57</sup> that £470,000 had been allocated to 19 projects throughout Scotland, the largest being funding for 62 e-bikes for a public hire scheme in Glasgow. A sum of £500,000 was available for the second round, with an application deadline at the end of November. Local authorities and public sector organisations can bid for funding up to £100,000 while bids from third sector and community organisations are limited to £15,000.

The Energy Savings Trust (EST) which administers the scheme states that in addition to enabling everyday functional journeys to be taken by cycling, the fund is intended to address wider policy themes, and recognizes the potential of active travel in supporting social inclusion, health and connectivity in the public transport system. The Cycling Action Plan for Scotland (2017-20) includes the target that by 2020 10% of everyday journeys in Scotland will be by bike. EST guidance suggests that projects might target people at risk of health issues caused by lack of physical activity and those excluded from employment opportunities in areas with poor transport links.

A further £100,000 has been made available through this fund to let members of the public test ride e-bikes through Home Energy Scotland advice centres, active travel hubs and community centres.

The Scottish government announced at the same time that it was making provision for e-bikes through the Low Carbon Transport Loan Fund, which aims to support organisations that want to reduce the carbon impact and fuel costs of their transport and travel arrangements with

more efficient alternatives. The fund provides interest-free loans up to £120,000 to Scottish businesses, with a repayment term up to six years. It includes an allocation of £500,000 for interest-free loans up to £3,000 to help individuals and businesses purchase e-bikes and e-cargo bikes.

Under the UK's Cycle to Work scheme employers can lease bikes tax free to employees. This scheme has recently been extended so that it can be used to buy an e-bike. However, it is limited to people who are in work (excluding the self-employed) and is only available to people whose main use of their e-bike will be for commuting.

## 7. Discussion and conclusions

Many European countries have incentivized electric bike use through publicly funded grant schemes with the aim of meeting goals for sustainability. In the UK this important policy tool has received little attention and the uptake of e-bikes is now lagging behind. The exclusion of e-bikes from the subsidies provided for other electric vehicles is both environmentally and socially regressive.

The box below summarises how an e-bike purchase incentive could work in the UK, based on lessons from the schemes in other countries.

### How an e-bike purchase incentive scheme could work in the UK

#### **National and local**

- A national grant scheme should be offered by the Office for Low Emission Vehicles, which already provides grants for purchase of electric cars.
- Local authorities should offer grants too, enabling experimentation with different approaches.
- European experience suggests grants of about £250 are effective.

#### **Keep it simple**

- Grants should be offered via retailers at point of sale, using an on-line portal to check validity: one e-bike per person.

#### **Partnerships with industry**

- The Bicycle Association could work with government to negotiate matched funding deals with the bicycle industry. For example, in Guernsey the government contributed 20% of the grant and the bicycle industry contributed 5%.

#### **Run as a 'campaign'**

- In France, schemes that were run as a 'campaign' in several waves, each of about 6 months, with fresh promotion each time, were the most effective.

#### **Try before you buy**

- Some areas should experiment with offering the chance to 'try before you buy' – e.g. one-year rental for £150 after which the e-bike can be bought at a discount.

Detailed evaluations of existing subsidy schemes show that electric bike use can be effective in supporting active travel, reducing car use and cutting emissions. In Oslo the Norwegian Centre for Transport Research reported that the subsidy enabled participants to double the proportion of their travel by bike and estimated that future e-bike users would reduce their CO<sub>2</sub> emissions from motorized travel in the region of 87-144kg per year. In France the ADEME study reported that on average, grant recipients increased their previous annual cycling distance by 1,200km and avoided 660km a year by car. The authors estimated that, taking into account reductions in all forms of motorized travel, including motorized two-wheelers, there is a reduction of 200kg CO<sub>2</sub> a year for each beneficiary, and a saving of nearly a tonne of CO<sub>2</sub> over a five-year period.<sup>58</sup> The study emphasizes both the cost effectiveness of the scheme and the benefit to the local economy.

If a £250 e-bike grant in Britain achieved similar reductions in car mileage to those achieved by the e-bike grant scheme in France, we conservatively estimate that over a five year period, the cost per kg of CO<sub>2</sub> saved would be 42p. For comparison, we estimate that for a Tesla Model S purchased under OLEV's current electric car grant scheme, the cost per kg of CO<sub>2</sub> saved is 88p (over five years, and with the average carbon intensity of the electricity supply)<sup>59</sup>. This means that an e-bike grant scheme would be more than twice as effective, per pound spent, as the current OLEV grants for electric cars.

European experience indicates both the popularity of subsidies and their effectiveness. A common story is that the volume of applications exceeds expectations – as in Oslo and the Channel Islands. Evaluations point to the role of incentives in stimulating e-bike uptake. In France the ADEME study found 31% of users would not otherwise have made the purchase while in the Oslo study 47% said the scheme had influenced their decision to buy a bike to a large extent and 41% to a degree. The impact of schemes is also apparent in the uplift of sales that followed the introduction of incentives in Sweden, France and the Channel Islands. In addition, subsidies appear to encourage the acquisition of better quality e-bikes.

An objection sometimes raised to incentive schemes is that, owing to the relatively high cost of an e-bike, they are not a socially progressive measure. This is debatable in that e-bike subsidies have enabled older people and people with health problems to extend their mobility choices and remain more active. Incentives for e-bikes also appear particularly effective in encouraging cycling among women, who have lower levels of conventional cycling than men, and are therefore an important target group. In these respects the measure can be seen as a socially inclusive one. Notably, Sweden's incentives also included subsidies for mobility vehicles. The inclusion of electric trikes for people with restricted mobility was also recommended by organisers of the scheme in Guernsey. Moreover, encouraging e-bike ownership amongst higher income groups, who typically own more motorized vehicles and drive more, is an effective means of reducing car use, and so cutting congestion and air pollution to the benefit of the wider community, and in this respect, is a social measure. As the ADEME study indicated, schemes can even result in small reductions in car ownership. Another way of responding to this issue is to ensure incentives are promoted to low-income groups, as the recent Scottish scheme attempts to do. A further option is to offer higher subsidies for lower income groups, though if restrictions are too tightly drawn this could limit the effectiveness of the incentive. Evidently, in terms of its affordability, many more people

would be able to take advantage of an incentive on an electric bicycle than on an electric car, meaning that e-bike grant schemes are much more progressive than e-car grant schemes.

The initiatives described above offer several recommendations for good practice. Experience in the Channel Islands points to the value of making the discount available at point of sale via the retailer. The ADEME researchers emphasize the importance of promotion and the need to renew initiatives with fresh publicity. They also suggest that it would be especially effective to combine short-term rental of e-bikes with the option of a grant for purchase.

In the schemes described in this paper, incentivizing e-bikes is not viewed as an isolated measure, but as part of a broad strategy to encourage active travel and reduce emissions. In Austria especially, incentives for e-bikes have helped to build a market and e-bike promotion is regarded as a highly effective policy in the country's Cycling Masterplan. In the UK, where only 2% of trips are currently made by bicycle, such promotion is long overdue, but could enable the electric bike to prove an important game-changer in meeting UK ambitions for cycling and moving towards a low-carbon transport system.

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