Title: The Electrically Assisted Pedal Cycles (Amendment) Regulations 2015 **IA No:** **Lead department or agency:** Department for Transport **Other departments or agencies:**	**Impact Assessment (IA)** **Date:** 22/12/2014 **Stage:** Final **Source of intervention:** Domestic **Type of measure:** Secondary legislation **Contact for enquiries:** Claire Rees, DfT-International Vehicle Standards: Claire.rees@dft.gsi.gov.uk

Summary: Intervention and Options

RPC Opinion: RPC Opinion Status

Cost of Preferred (or more likely) Option				
Total Net Present Value	**Business Net Present Value**	**Net cost to business per year** (EANCB on 2009 prices)	**In scope of One-In, Two-Out?**	**Measure qualifies as**
£194m	£6.3m	£-0.6m	Yes	OUT

What is the problem under consideration? Why is government intervention necessary?

The current EAPC Regulations that define an electrically assisted pedal cycle for various aspects of road traffic law came into force in GB in 1983. There have subsequently been significant developments in: technology and applicable technical standards; cycle use; and consumer markets. Recent EU legislation has specified the features of an EAPC that exempt it from type approval at the manufacturing stage. The features differ from those in the GB regulations. This means that the most commonly produced EU bicycles cannot be used in the UK without road tax and a driving licence. Intervention is required to: recognise the technological and societal developments; harmonise GB requirements with the EU market; and minimise the risk of barrier-to-trade legal challenge, to support EAPC sales in the UK.

What are the policy objectives and the intended effects?

A comprehensive review of the current regulations was undertaken as part of stakeholder consultation and the Government's Red Tape Challenge. The objectives are derived from that review. The principal objective is to simplify and reduce the legislative burden whilst maintaining or improving safety standards. The second objective is to promote cycling as a mode of transport that has health and environmental benefits. The third objective is to create the potential to reduce congestion and operating costs for both consumers and commercial users of EAPCs. This measure seeks to increase EAPC sales by harmonising UK legal standards for EAPCs with EU standards.

What policy options have been considered, including any alternatives to regulation? Please justify preferred option (further details in Evidence Base)

Do Nothing. (The existing regulations would remain in force).
Option 1 (Preferred Option) - Amend the existing regulations to: increase the maximum permitted electric motor power for standard bicycles from 200 to 250W; remove the weight limits for all types of EAPC; enable EAPCs with more than 3 wheels to be used if there is a market for them; bring up to date the references to technical standards that help define an EAPC. The maximum speed at which electrical assistance must cease would be amended from 15 m.p.h. to 15.5 m.p.h. to more accurately reflect the 25 km/h limit in EU legislation and in current technical standards.
Given the current regulatory position, the Preferred Option is considered to be the only practicable method of dealing with the problems identified and achieving the above objectives.

Will the policy be reviewed? It will not be reviewed. **If applicable, set review date:**

Does implementation go beyond minimum EU requirements?			No		
Are any of these organisations in scope? If Micros not exempted set out reason in Evidence Base.	**Micro** Yes	**< 20** Yes	**Small** Yes	**Medium** Yes	**Large** Yes
What is the CO_2 equivalent change in greenhouse gas emissions? (Million tonnes CO_2 equivalent)			**Traded:**	**Non-traded:** Negligible	

I have read the Impact Assessment and I am satisfied that, given the available evidence, it represents a reasonable view of the likely costs, benefits and impact of the leading options.

Signed by the responsible Minister Claire Perry Date: 12/01/2015

Summary: Analysis & Evidence

Policy Option 1

Description: Amend current EAPC Regulations

FULL ECONOMIC ASSESSMENT

Price Base Year 2014	PV Base Year 2014	Time Period Years 10	Net Benefit (Present Value (PV)) (£m)		
			Low: £97m	**High:**£290m	**Best Estimate:** £194m

COSTS (£m)	**Total Transition** (Constant Price)	Years	**Average Annual** (excl. Transition) (Constant Price)	**Total Cost** (Present Value)
Low	Optional		£0	**£0**
High	Optional		£0	**£0**
Best Estimate	£0		£0	**£0**

Description and scale of key monetised costs by 'main affected groups'

Deregulatory, so no costs. Costs to consumers and businesses incurred by adopting EAPCs are considered in the benefits assessment to arrive at net operational savings.

Other key non-monetised costs by 'main affected groups'

BENEFITS (£m)	**Total Transition** (Constant Price)	Years	**Average Annual** (excl. Transition) (Constant Price)	**Total Benefit** (Present Value)
Low	Optional		£13	**£97m**
High	Optional		£38	**£290m**
Best Estimate	£0		£25	**£194m**

Description and scale of key monetised benefits by 'main affected groups'

- Consumers (car operating cost savings, health benefits, congestion and wider impacts), £92m - £267m;
- Businesses (congestion savings),
  £5.8m - £22.9m

Other key non-monetised benefits by 'main affected groups'

- Benefits to the cycling industry from increased electric bike sales, although these are likely to be displaced by reduced expenditure in other retail sectors.

Key assumptions/sensitivities/risks **Discount rate (%)** 3.5

Forecast increase in bike sales by 7,850 to 20,400 units by 2024. Each additional cycle displaces 565-900 km of car, and 179km of bus use per year. Estimated consumer cost savings of 23p per car km and 5p per bus km switch to EAPC. Annual health benefits of £494 per cyclist in 2014. Profit margin for EAPC ranges from 7% to 10%. Direct benefit from increased EAPC sales offset by indirect cost of decreased sales elsewhere in the economy.

BUSINESS ASSESSMENT (Option 1)

Direct impact on business (Equivalent Annual) £m:			In scope of OITO?	Measure qualifies as
Costs: £0	**Benefits: -**£0.58m	**Net: -£0.58m**	Yes	Out

Evidence Base (for summary sheets)

1 Problem under consideration.

1.1 This Impact Assessment concerns proposed amendments to The Electrically Assisted Pedal Cycles Regulations 1983, which apply in Great Britain. The Regulations set out the requirements which bicycles, tandem bicycles and tricycles must meet in order to be classified as EAPCs for use on roads. They are made under powers in primary legislation[1] which state that compliant EAPCs are not legally considered to be motor vehicles and so are not required to be registered, display a vehicle excise disc or be insured as a motor vehicle. Riders are not required to hold a valid driving licence.

1.2 The current GB Regulations define an EAPC as follows:

- It must be fitted with pedals by means of which it is capable of being propelled;
- The electric motor must cease providing assistance when the vehicle reaches 15 m.p.h.;
- The unladen weight (including batteries but without rider/cargo) must not exceed 40kg for bicycles and 60kg for tandems or tricycles; and
- The maximum continuous rated power output of the motor must not exceed 200W for bicycles and 250W for tandems and tricycles.

1.3 In early 2009, CEN (the European Standards body) published a new standard relating to two-wheeled EAPCs[2]. In the European standard, the speed up to which the electric motor may provide assistance is 25 km/h (15.5mph), the maximum power output for bicycles is higher (250W) and the standard does not restrict the weight.

1.4 A recent EU Regulation - 168/2013 - mandates harmonised safety standards for motorcycles. Compliance will be achieved through type approval at the manufacturing stage (or Individual Vehicle Approval prior to first use). However, the Regulation excludes EAPCs from its scope provided that the maximum motor power does not exceed 250W and motor assistance reduces progressively with speed and ceases at 25km/h. There are no restrictions on the number of wheels and no weight limits.

1.5 The GB Regulations do not prohibit vehicles from being classed as EAPCs if they have "Twist and Go" capability - i.e. vehicles fitted with a motor which can provide power assistance at any time without the rider pedalling (to the extent that such vehicles still meet the criteria in 1.2). However this type of product is now within the scope of EU Regulation 168/2013 and so will need to be type or individually approved for use on roads.

1.6 The following table compares the current GB EAPC definition with the BS-EN Standard and EU Regulation:

REQUIREMENT	GB Regulations	BS-EN Standard (bicycles) EU Regulation 168/2013 (any number of wheels)
Maximum Power	Bicycles 200W Tandems and Tricycles 250W	250W
Maximum Weight	Bicycles 40kg Tandems and Tricycles 60kg	No Limit
Speed at which electrical assistance must cease	15 mph	25 km/h
Power assistance	Not specified	Only available when rider is pedalling

Table 1 Comparison of EAPC classifications

1.7 Since the 1983 Regulations came into force, there have also been changes to: technology - in particular power supply, where heavy lead-acid batteries have largely been superseded by lighter and

[1] section 103(1) of the Road Traffic Regulation Act 1967 and section 193(1) of the Road Traffic Act 1972

[2] BS EN 15194:2009 Cycles - Electrically power assisted cycles - EPAC Bicycles

more efficient lithium-ion batteries; and in societal attitudes towards cycle use both for consumers and businesses in relation to congestion, operating costs, emissions and health.

1.8 Safety standards applicable to EAPCs when used on roads in GB are prescribed in the Pedal Cycles (Construction and Use) Regulations 1983 and in the Road Vehicles Lighting Regulations 1989 as amended. It is proposed to make some complementary changes to the Construction and Use Regulations to provide up to date references to appropriate current technical standards and to align vehicle plating requirements with BS-EN standards.

2. Reasons for intervention

2.1 In 2010, the Department consulted on proposals to address some of the disparities between the GB EAPC definition and the EU classification of electrically assisted cycle contained in the then applicable Framework Directive 2002/24 on the type approval of motorcycles. The proposals *"suggested amendments to the GB Regulations to provide closer alignment with the European provisions. Our aim is to simplify the Regulations to benefit retailers and consumers. Failure to align could result in Legal challenge to our national rules by the European Commission."*

2.2. Following the consultation, the Department issued the following statement:

"The Department for Transport has considered the responses to this consultation and supports recommendations to harmonise power limits (from 200 Watts to 250 Watts) with similar provisions in place across Europe. This will provide consumers with access to a wider range of electrically assisted cycles.

Regulatory proposals will be developed to update the GB power limit for electric cycles once EU discussions on a much wider group of 2, 3 and light 4-wheeled vehicles conclude. We expect this process to be completed during 2012. In the mean time we will also carry out further work to consider whether other parameters (e.g. weight limits) could also be simplified or updated to reflect modern designs.

The outcome of EU discussions could have implications for how we regulate EAPCs nationally. It would therefore be unhelpful to pre-empt the outcome of these discussions and to make changes to national rules which might need to be subsequently repealed."

2.3 Shortly thereafter in 2011, the Government launched its Red Tape Challenge (RTC) review with the objective of reducing overall domestic regulation for business. This included legislation on Road Safety and Cycling:

"These regulations aim to ensure that we reduce road accidents and injuries without unnecessarily restricting personal freedoms. They cover road rules, speed limits and regulations which aim to protect the safety of road users such as the wearing of motorcycle helmets and seat belts.
Tell us what you think should happen to these regulations and why, being specific where possible:

- *Should we scrap them altogether?*
- *Could their purpose be achieved in a non-regulatory way (e.g. through a voluntary code?) How?*
- *Could they be reformed, simplified or merged? How?*
- *Can we reduce their bureaucracy through better implementation? How?*
- *Can we make their enforcement less burdensome? How?*
- *Should they be left as they are?"*

2.4 At the end of the RTC review period, the Department commissioned the Transport Research Laboratory (TRL) *"to gather, generate and expert-review evidence from a wide variety of sources (including Red Tape Challenge and the 2010 EAPC consultation responses) on the forces and pressures influencing pedal cycle construction, sale and use in Great Britain, and provide DfT with costed, practical and appropriate options for legislative change."* That review incorporated insight and advice from stakeholders from the cycle industry, cyclist organisations and regulatory/enforcement authorities and drew on existing research from a wide variety of sources. It identified significant benefits that could be derived from amending the existing GB EAPC Regulations to reflect changes since 1983 to technology, cycle use, and the consumer market, and aligning them with the most recent EU legislation and standards - in particular, EU Regulation 168/2013 (which supersedes Directive 2002/24) and BS-EN 15194. The benefits are described in this impact assessment.

3. Policy objectives

- Simplify and reduce the legislative burden whilst maintaining or improving safety standards.
- Promote cycling as a mode of transport that has health and environmental benefits.
- Reduce congestion and reduce operating costs for consumers and commercial users of EAPCs.

4. Description of options considered

Do Nothing. The existing regulations and restrictions would remain in force.

Option 1 (Preferred Option) - Amend the existing regulations to:

- increase the maximum permitted electric motor power for standard bicycles from 200 to 250W;
- remove the weight limits for all types of EAPC;
- enable EAPCs with more than 3 wheels to be used if there is a market for them;
- bring up to date the references to technical standards that help define an EAPC.

The maximum speed at which electrical assistance must cease would be amended from 15 mph to 15.5 mph to more accurately reflect the 25 km/h limit in EU legislation and technical standards.

5. Monetised and non-monetised costs and benefits of each option (including administrative burden)

Option 1

Costs

5.1 As the preferred option is de-regulatory, and no evidence has been provided or otherwise identified that suggests any significant quantifiable additional safety (accident/casualty) or other costs, **the impact assessment assumes negligible costs.** The familiarisation costs will be negligible as UK rules will be aligned with the EU, which bike manufacturers and retailers will already be aware of. Over time alignment of the regulations will reduce familiarisation costs to new businesses and retailers that will not have to be aware of separate regulations in different countries. Other costs such as CO2 disbenefits from walking or cycling trips to were looked at but considered negligible by TRL so have not been estimated in the section below.

Benefits - EAPC Bicycles

Benefits would derive from increased cycle sales that would deliver

- travel cost savings
- CO_2 savings
- improved health
- congestion cost savings

as calculated below. The sources of italicised references are detailed in para 5.31 below.

Calculation of increased cycle sales

5.2 A review of EU EAPCs shows that the majority of the EAPCs sold in the EU have 250W engines. Currently under UK law Vehicles above 200W are required to be type approved, pay road tax, and drivers are required to undertake compulsory basic training and users must wear helmets. The combination of these rules means this will significantly restrict the number of bicycles taken up in the UK. Therefore, benefits will be available for the EAPC bicycle market through harmonisation with the EU's 250W maximum motor power limit. This, stakeholders confirm, would likely lead to lower prices, improved marketability and importantly increased sales. Some of these sales, and the journeys made by such cycles, have the further potential to displace journeys by car (or bus) and thus provide fuel, emissions, health, noise and congestion benefits.

5.3 It is difficult to precisely estimate the impact on the market of the change to regulations. TRL used the consultation process to get views from experts in the industry. The UK market for EAPCs is much smaller than in similar EU countries both in terms of the proportion of the bicycle fleet that is EAPCs and the growth rates of EAPC sales. EAPC stakeholders advised that, if harmonising with the EU allowed the UK market to grow similarly to the Dutch and German markets over recent years, sales would increase from about 20,000 per annum now to approximately 400,000 per annum within 5 years and 1 million after 10 years. That is equivalent to an annual average growth rate of almost 50% over the ten year period. In the absence of such harmonisation, the same stakeholders suggest growth of only 20-30% per annum, equivalent to annual sales in 5 years time of no more than 75,000 and around 300,000 in 10 years time. TRL tested these annual growth rate estimates against data in Netherlands and Germany. The Netherlands show annual growth rates of 35% from 2004 to 2011, and data from Germany shows annual growth rates of 34% from 2007 to 2012. TRL's view was that while speculation of 50% compound growth rates for the UK over 10 years may thus be overly ambitious, a rate of 30% over that period did seem reasonable.

5.4 However, it is recognised that there are fundamental differences between the UK EAPC market, versus France, Germany or the Netherlands. In particular, the UK bike market sees relatively high bike sales versus the number of people that cycle regularly. This is important, as due to their cost, consumers are only likely to purchase an EAPC if they cycle regularly. A recent study on the proportion of people that use a bike as their main made of travel helps identify regular cyclists in the UK, the Netherlands, France and Germany *(EC Future of Transport, 2010)*. This can be combined with data on the relevant national population *(Eurostat)* to estimate the number of people in each country that use a bike as their main travel mode. Finally, this can be used to estimate EAPC sales per person cycling as their main transport mode, reported below. This data shows that the UK has relatively EAPC sales compared to the number of people that cycle regularly, when compared to France, Germany, or the Netherlands; however, the difference is much smaller than if you look at EAPC sales as a proportion of total bike sales.

Table: Estimate of potential increase of EAPC sales in the UK

	EAPC sales	% Cycling as main transport mode	Population	Number of people cycling as main transport mode	EAPC sales per person cycling as main transport mode (per '000)	Increase versus UK
United Kingdom	30,000	2%	63,495,303	1,396,897	21	
France	46,000	3%	65,287,861	1,697,484	27	26%
Germany	380,000	13%	80,327,900	10,522,955	36	68%
The Netherlands	175,000	31%	16,730,348	5,219,869	34	56%

5.5 This data can be used to provide an estimate of the potential impact of aligning UK regulation with the EU. Aligning UK regulation with the EU would be expected to increase sales of UK EAPCs per person cycling as their main transport mode, to levels broadly seen with similar EU countries. **Based on the data above this IA assumes an increase in EAPC sales in the UK of between 26% and 68%.** There is also uncertainty about how quickly this alignment would take place. In theory this increase should happen instantaneously as consumers purchase the bikes now available, but in reality there is likely to be some friction which delays the increase in bike sales, from new vehicles being advertised or imported and cyclists become aware of these new brands. This IA takes a conservative approach assuming the increase in sales takes place over the full 10 year appraisal period, in a linear fashion.

5.6 A final consideration is whether to factor in growth in EAPC sales in the baseline and policy scenario over time, reflecting background growth in EAPC use and EAPC market maturing. As noted above countries across the EU have seen quickly increasing sales of EAPCs over recent years. However, it is difficult to forecast to what extent these growth rates will continue going forwards, and this can lead to exponential growth figures that create additional uncertainty in forecasts; there is also some evidence from France that the market may be reaching maturity (sales in 2013 in France were less than

2012). A further consideration is the fact that any increases in sales may be driven by other factors, which would be accounted for in other Impact Assessments. For instance, there is increasing investment in cycling infrastructure, which would be expected to increase the number of people using cycling as their main mode of transport and thereby increasing EAPC sales, but it would not be appropriate to allocate these benefits to this IA as these increases result from other drivers. **This IA uses a proportionate and conservative assumption that EAPC sales are not projected to increase in the baseline and policy scenario due to other factors.**

Table 1: bike sales in the baseline and policy options

	Baseline	Low	High
2014	30,000	30,000	30,000
2015	30,000	30,785	32,044
2016	30,000	31,571	34,089
2017	30,000	32,356	36,133
2018	30,000	33,142	38,178
2019	30,000	33,927	40,222
2020	30,000	34,713	42,266
2021	30,000	35,498	44,311
2022	30,000	36,284	46,355
2023	30,000	37,069	48,400
2024	30,000	37,854	50,444

Calculation of business savings and EANCB

5.7 This measure is a regulatory OUT. The direct benefits to business captured below are assumed to be increased profits from increased bike sales. This is because the measure removes a regulatory barrier, which allows people to purchase the vehicles they desire. The profits from increased sales flow directly from the increased sale of bikes which is the principle objective of the deregulatory measure. The Impact Assessment also values benefits from reduced congestion, which flows from increased sales. However, these are not considered direct because the choice of how to use the bike is a subsequent decision from that to purchase a bike, and is further away from the intervention.

Estimating profits to bike industry from increased bike sales

5.8 A major source of benefits to the UK cycling industry will be the value of increased bike sales. This will increase revenue for manufacturers and retailers of the EAPCs. LSE estimate that in 2011 3.7 million bicycles were sold in the UK valued at £1.6billion to the UK economy. The UK bike manufacturing sector is currently small, valued at just £51m. Therefore, this IA concentrates solely on the benefits to the retail sector from increased sales of EAPCs.

5.9 There is no publically available data on the average cost of an EAPC bike in the UK. However, EAPCs are typically valued at between £500-£2000. Data on the average cost is available from France and the Netherlands (no data is available for EAPCs in Germany), with the average EAPC valued at €837 and €1,821 respectively in 2012, or £734 and £1,596 respectively in 2014 prices once converted to pound sterling using HMRC published exchange rates for the year to Mar 31, 2014. This suggests an average bike price of £1,165 in the UK in 2014, which is consistent with suggested prices from online retail literature.

5.10 Increased EAPC sales to the UK will generate significant value to the bike retail sector, due to the additional turnover generated, which is a direct benefit to this industry. The value of increased sales are reported below.

Table 15: value of additional EAPC sales to UK economy (£m)

	Additional ebike sales		Value of sales	
	Low	High	Low	High
2014	-	-	£0.00	£0.00
2015	785	2,044	£0.91	£2.38
2016	1,571	4,089	£1.83	£4.76
2017	2,356	6,133	£2.74	£7.14
2018	3,142	8,178	£3.66	£9.52
2019	3,927	10,222	£4.57	£11.91
2020	4,713	12,266	£5.49	£14.29
2021	5,498	14,311	£6.40	£16.67
2022	6,284	16,355	£7.32	£19.05
2023	7,069	18,400	£8.23	£21.43
2024	7,854	20,444	£9.15	£23.81

5.11 To estimate the value to the bike retail sector it is necessary to estimate the proportion of turnover that the retail sector takes as profit, once costs are taken into account. There is no direct data available on the profits for these companies. However, these can be estimated based upon data from the Annual Business Survey *(ONS)*. This provides estimates of companies turnover, and costs (including, purchases, employment, and net capital expenditure). Data is provided for the period 2008 to 2013 for a range of retail sectors. It is not possible from this survey to identify data specifically for bike or electric bike retailers, the closest match is "retail sale of sporting equipment". Data is also provided below for retail (excluding motor vehicles) as a whole.

Table: Estimating profit as a % of turnover from Annual Business Survey Data (£m)

		Total Turnover	Total purchases	Total employment costs	Total net capital expenditure - inc NYIP	Estimated profit	Profit as % of turnover
Retail trade, except of motor vehicles and motorcycles	2008	311,745	246,237	38,466	9,069	17,973	6%
	2009	319,318	249,058	38,914	7,784	23,562	7%
	2010	332,131	261,676	39,816	6,149	24,490	7%
	2011	342,147	271,203	41,592	9,051	20,301	6%
	2012	348,556	274,981	42,010	9,443	22,122	6%
	2013	358,792	280,833	43,562	9,815	24,582	7%
Retail sale of sporting equipment in specialised stores	2008	5,262	3,867	701	151	543	10%
	2009	5,673	4,300	678	51	644	11%
	2010	5,720	4,429	776	105	410	7%
	2011	5,595	4,431	753	91	320	6%
	2012	6,239	4,768	778	110	583	9%
	2013	6,543	4,758	779	94	912	14%

5.12 For the period 2008 to 2013, the average profit as a percentage of turnover for retail sales of sporting equipment in specialised stores is 10%; this is higher than the average for the retail sector as a whole, which has an average of 7%. Given the fact that no exact match for the bicycle sector is available, **this Impact Assessment assumes a lower bound of 7% and an upper bound of 10% estimate for profit margin on sales of EAPCs.** This is applied to the total value of EAPC sales to estimate total profit for the sector.

Table: Value of profit to bike retail sector from increased EAPC sales

	Value of profit to bike retail sector			
	Low		High	
2014	£	-	£	-
2015	£	0.06	£	0.23
2016	£	0.12	£	0.46
2017	£	0.18	£	0.69
2018	£	0.24	£	0.92
2019	£	0.30	£	1.15
2020	£	0.36	£	1.38
2021	£	0.42	£	1.61
2022	£	0.48	£	1.84
2023	£	0.54	£	2.07
2024	£	0.60	£	2.30
NPV	**£**	**2.71**	**£**	**10.31**

5.13 Familiarisation costs are assumed to be negligible for this Impact Assessment. This is because this is a deregulatory measure that aligns policy with EU legislation, which bike manufacturers and retailers will already be aware of. The announcement that UK regulation is changing to be aligned with the EU will be shared through industry media, and then no further action will be required of manufacturers. Therefore, the scale of familiarisation cost will be small and it would be disproportionate to estimate this in more detail.

5.14 This provides an overall NPV estimate of business benefits of £2.7m to £10.3m over the period 2015-24.

5.15 The IA has used the BIS Impact Assessment calculator to estimate the EANCB to business. This uses a price base and present value base year of 2014, with an appraisal period of 10 years. **The central estimate of business net present value is £6.3m. The central estimate for net cost to business using the calculator is -£0.58m per year.**

Calculation of Total Costs and Benefits from this measure

5.16 A key assumption to estimate the total benefits resulting from electric bikes is the total additional EAPCs on the road, which is related to the life expectancy of the bikes. Evidence from online appraisal of lifecycle benefits typically provide estimates of life expectancy of 15,000 miles, equivalent to just over 6 years' use. This figure is applied to estimate the cumulative additional bikes on the road in subsequent calculations.

Table 2: additional bike sales and cumulative additional bikes on the road

	Additional bike sales		Additional bikes on the road	
	low	high	low	high
2014	-	-	-	-
2015	785	2,044	785	2,044
2016	1,571	4,089	2,356	6,133
2017	2,356	6,133	4,713	12,266
2018	3,142	8,178	7,854	20,444
2019	3,927	10,222	11,782	30,666
2020	4,713	12,266	16,494	42,933
2021	5,498	14,311	21,207	55,199
2022	6,284	16,355	25,920	67,465

2023	7,069	18,400	30,632	79,732
2024	7,854	20,444	35,345	91,998

Calculation of travel cost savings

5.17 The benefits to consumers from purchasing electric bikes is measured by the consumer surplus generated from purchasing electric bikes. Consumer surplus measures the net benefit the consumer gets from consuming a good. Direct data on consumer surplus is not available for this study, therefore an alternative method for estimating benefits is applied. This measures the net economic benefit to consumers purchasing bikes by the difference in cost between the transport mode they use in the baseline under the preferred policy option. To undertake this calculation requires an estimate of the proportion of trips taken by different modes in the baseline. Looking at data from short trips (those under 10 miles) the Department for Transport's National Travel Survey (NTS) shows that 24% of trips arise from single occupancy car/van use with an additional 1% of trips from taxi use, 7% of trips are from bus use, and 2% of trips are from surface rail. A significant proportion of trips are from multiple occupancy cars, where it is assumed that if one person chooses to cycle the car journey remains, and therefore there is no reduction in car kms. In other cases the increase in kms is taken from existing walking or cycling trips. This assumes that bike trips are mainly taken in urban areas, where the time taken for a cycle trip is likely to be similar to that of a car trip, and quicker than that for transport modes such as bus.

Table 3: National Transport Survey Data on trips of 10 miles or less

	Trips 10 miles or under
Private:	
Walking and cycling	28%
Single Occupancy car/van driver	24%
Multiple occupancy car/van driver	37%
Other private transport	1%
Public:	
Bus	7%
Underground or rail	2%
Taxi / minicab	1%
Other public transport	0%

5.18 The Impact Assessment quantifies the benefits to consumers of the switch from car and taxi kms to EAPC use. It also quantifies the small benefits to consumers switching from bus use to EAPC use. The benefits to other users are excluded as the proportion of users is small. The switch from walking or cycling a conventional bike to using an EAPC may result in increased costs to EAPC users. However, as the measure is deregulatory it is the consumer’s decision to purchase the bike, and therefore they must perceive an overall benefit of the choice to cycle, assuming zero benefit for these users is therefore a conservative assumption.

5.19 To understand the savings from switching to cycling requires an estimate of the kms cycled per bike. DfT NTS data shows that the average cyclist rides 19 miles per week (*NTS0314*), or 1,594 kms per year. Evidence on electric cycles shows that cyclists typically use EAPCs more and cycle further than conventional bikes, for instance data from *Transport Research Laboratory* and *Leeds* show that EAPC users tend to cycle further. Evidence from randomised control trials in Norway (*Norwegian Centre for Transport Research)* showed that EAPC users increased cycle distances by 52% compared to conventional cyclists. This impact assessment assumes EAPCs used in the UK will cycle 50% further than conventional cyclists, which is consistent with the available EU evidence, and in line with the non-quantified UK evidence. **Therefore, this impact assessment assumes EAPC users cycle 2,392 kms per year.** Direct evidence from *PRESTO (2010b)* cites research that every EAPC displaces 900 km of car use per year. Data from the National Travel Survey is used to supplement this to check the reduction in car use and better understand where trips come from. Data from the National Travel Survey can be used to estimate the displacement of car kms for each additional cycle km. Cars and taxis make up 25%

of single occupancy trips under 10km. If we assume cycle journeys are taken from the average journey under 10km then this suggests 25% of trips, or 565 car kms would be displaced. **The impact assessment applies a range of reduced car kms from 565 km to 900 km.** Data from the NTS suggests that 7% of trips of less than 10kms are bus, therefore this is used to estimate bus use of cyclists in the baseline. **The impact assessment estimates that 179km of bus kms are reduced for each EAPC each year**.

Table 4: Estimates of increased cycle kms and reduced car and bus kms

	Additional cycle kms (m)		Reduced car kms (m)		Reduced bus kms (m)	
	low	high	low	high	low	high
2014	0.0	0.0	0.0	0.0	0.0	0.0
2015	1.9	4.9	0.5	1.8	0.1	0.4
2016	5.6	14.7	1.4	5.5	0.4	1.1
2017	11.3	29.3	2.8	11.0	0.8	2.2
2018	18.8	48.9	4.7	18.4	1.4	3.7
2019	28.2	73.3	7.0	27.6	2.1	5.5
2020	39.4	102.7	9.8	38.6	3.0	7.7
2021	50.7	132.0	12.6	49.7	3.8	9.9
2022	62.0	161.4	15.4	60.7	4.6	12.1
2023	73.3	190.7	18.2	71.8	5.5	14.3
2024	84.5	220.0	21.0	82.8	6.3	16.5

5.20 The *AA (2012)* suggest that motoring costs for cars vary enormously according mainly to the initial purchase price (and thus depreciation costs) and annual mileage. If a typical car is taken to be one costing £14,000 - £22,000 (petrol or diesel) and travelling 10,000 miles per year, the costs are stated to be around 60p per mile. **For the impact assessment it is assumed that the overall car motoring costs of 60p per mile (rounded to 38p per km) are reasonable assumptions for the 2015-2024 period.**

5.21 Conventional cycling costs are estimated to be about 10p per mile or 6p per km *(GoSmarter, 2013)*, based on a £300 bike lasting 5 years and cycling 2,000 miles per year. EAPCs have a significantly higher purchase cost, but the costs of maintenance are similar to a conventional bike and the costs of electricity are small and they have a slightly longer life expectancy. The life expectancy of a bike depends on the battery life, internet sources suggests a typical battery should last around 15,000 miles, which based on the figures used for mileage in this IA suggest a life expectancy of 6 years. Other running costs includes replacing parts (tyres, chains, brake cables) and the costs of annual service charges, for a more expensive bike information from internet sources suggest these costs can be c.£1000 over 6 years[3]. Electricity use is estimated at 7.5 watt hours per km, which suggests a total electricity use of 113kWh over the vehicle lifetime, costing £18 using DECC electricity prices. **Assuming an electrically assisted pedal cycle retails at £1,165 based on the mileage figures quoted above and factoring in running and maintenance costs it is estimated that the running costs of an EAPC bicycle are 15p per km. This means that an EAPC is assumed to save on average 23p per km for every km it replaces a car.**

Table: Estimate of EAPC running cost per km

	EAPC Cost (£)	Cost of parts and maintenance (£)	Electricity Cost (£)	Total Cost (£)	Lifetime km	Average cost (p per km)
Lifetime	1165	1000	18	2183	15000	15

5.14 The benefits to consumers from switching from bus use are also estimated. This applies the assumption that 8% of bike kms switch from bus use. The cost per km of bus use is estimated by

[3] http://www.jakesbikes.co.uk/resources/documents/cost%20of%20ownership.pdf

dividing the operating revenue for bus companies by the total passenger kms. In 2012/13 the operating revenue of bus companies was £5,440m, and there were a total of 28,900 passenger kms. This results in an average cost per passenger of 19p per km (in 2012/13 prices) or 20p per km in 2014 prices. **This means that an EAPC is assumed to save on average 5p per km for every km it replaces a bus (i.e. 20 – 15).** It is assumed that cycling journeys will be undertaken in urban environments, where cycling is likely to be as fast if not faster than taking public transport, therefore value of time estimates are not included in these calculations.

Table 5: estimated consumer benefits from cost savings (£m)

	Estimated car savings		Estimated bus cost savings	
	low	high	low	high
2014	£0.0	£0.0	£0.0	£0.0
2015	£0.1	£0.4	£0.0	£0.0
2016	£0.3	£1.3	£0.0	£0.1
2017	£0.6	£2.5	£0.0	£0.1
2018	£1.1	£4.2	£0.1	£0.2
2019	£1.6	£6.3	£0.1	£0.3
2020	£2.2	£8.9	£0.1	£0.4
2021	£2.9	£11.4	£0.2	£0.5
2022	£3.5	£14.0	£0.2	£0.6
2023	£4.2	£16.5	£0.3	£0.7
2024	£4.8	£19.0	£0.3	£0.8

Calculation of external benefits from reduced car use

5.22 DfT publishes estimates of the external benefits and costs associated with reduced car use. These estimate the impacts on wider society (excluding the driver themselves) of each km of car use. These are used to estimate the benefits of reduced car use for a range of outcomes. Reducing car use results in reduced congestion, damage to infrastructure (primarily roads), accidents, air pollution, noise, and greenhouse gases. It also results in reduced taxation (primarily fuel duty) which is treated as a cost to the society – as it reduces exchequer income. Of particular importance to this impact assessment are reduced congestion benefits, as a proportion of these benefits apply to business. The figures below are provided for 2015, but the values evolve over the period to 2024. The largest changes to these values are increases in the benefits from reduced congestion in line with forecasts of traffic growth, and reductions in indirect taxation, as cars become more efficient. Other values stay broadly the same. (See WebTAG databook for more detail.) The external costs from reduced bus usage are not estimated here as bus occupancy will be generally high and therefore the impact is forecast to be marginal. The accident benefits from reduced car use are ignored as any potential costs from increased accidents are not included in the earlier section for bikes.

Table 6: marginal external costs of car use (2015)

	p per km
Congestion	13.1
Broken down into:	
Congestion (business)	5.7
Congestion (consumer)	7.3
Infrastructure	0.1
Local Air Quality	0.1
Noise	0.1
Greenhouse Gases	0.8
Indirect Taxation	-5.3
Net impact	23.8

5.23 It is estimated that 44% of the reduced congestion benefits are received by business based upon the proportion of traffic made up by business and the difference in the cost of congestion between businesses and consumers. These calculations are important to estimate business benefits but are technical and mechanical and are therefore reproduced in Annex A.

5.24 Applying these costs to the reduction in car kms reported previously results in the following impacts. These are broken down into congestion benefits for business and consumers and other non-business impacts.

Table 7: external benefits from reduced car use (£m)

	Congestion Business		Congestion consumer		Other non-business	
	Low	High	Low	High	Low	High
2014	£0.0	£0.0	£0.0	£0.0	£0.0	£0.0
2015	£0.0	£0.1	£0.0	£0.1	£0.0	-£0.1
2016	£0.1	£0.3	£0.1	£0.4	-£0.1	-£0.2
2017	£0.2	£0.7	£0.2	£0.9	-£0.1	-£0.4
2018	£0.3	£1.2	£0.4	£1.6	-£0.2	-£0.7
2019	£0.5	£1.9	£0.6	£2.5	-£0.3	-£1.1
2020	£0.7	£2.9	£0.9	£3.6	-£0.4	-£1.5
2021	£1.0	£3.9	£1.3	£4.9	-£0.5	-£1.8
2022	£1.3	£5.0	£1.6	£6.4	-£0.5	-£2.2
2023	£1.6	£6.2	£2.0	£7.9	-£0.6	-£2.5
2024	£1.9	£7.6	£2.4	£9.6	-£0.7	-£2.7

Calculation of health benefits

5.25 There would also be health benefits from transferring some car journeys to EAPC, and congestion reduction benefits. *LSE (2011)* cites evidence that frequent cyclists may well have, on average one less sick day per year than non-cyclists, valued at £78, for example. The Health Economic Assessment Tool (HEAT) adopted for use within WebTAG can be used to quantify the health benefits of cycling. It does not cater specifically for EAPCs, as opposed to conventional pedal cycles, but *Presto (2010b)* indicates that an EAPC cyclist uses at a given speed about 80% of the energy he would use on a conventional bike; 2,392 km of EAPC use can thus be assumed equivalent, in health terms, to 1,913 km on a conventional bike. Running the HEAT for cycling tool suggests that every 1,000 EAPC additional users undertaking this level of activity would save 0.39 deaths per annum. The value of a statistical life used is from WebTAG, £1.8m (2014 value; 2014 prices). Therefore, the annual benefit for 1,000 cyclists is £697,000, equivalent to £697 per EAPC user per year (the value rises in later years, in line with WebTAG guidance based on GDP per capita). Data from the National Travel Survey suggests that 28% of these trips would be undertaken in the baseline. **Therefore, the assumed additional benefit from increased cycle trips is estimated at £500 for each EAPC cyclist in 2014.** The estimated health benefits are applied to cumulative bikes on the road to generate annual health benefits.

Table 8: estimated health benefits (£m)

	Estimated health benefits	
	low	high
2014	-	-
2015	0.4	1.0
2016	1.2	3.1
2017	2.5	6.4
2018	4.2	10.9
2019	6.4	16.6
2020	9.2	23.8
2021	12.0	31.3
2022	15.0	39.0
2023	18.0	47.0
2024	21.2	55.2

Calculation of overall EAPC bicycle savings

5.26 Bringing the above costs together provides the following estimates of overall benefits from EAPC sales. Please note that the direct benefits to business are not included in the overall benefits listed below. This is because the increase in expenditure on EAPC bicycles will be offset elsewhere in the economy, by a reduction in expenditure elsewhere. There is a direct benefit to the EAPC industry, but overall it would not be expected that there is an increase in profits for business across the economy.

Table 9: total and business benefits from EAPC bicycle sales (£m)

	Total Benefits	
	Low	High
2014	£0.0	£0.0
2015	£0.6	£1.6
2016	£1.7	£5.0
2017	£3.4	£10.2
2018	£5.8	£17.4
2019	£8.9	£26.6
2020	£12.8	£38.1
2021	£16.9	£50.2
2022	£21.1	£62.8
2023	£25.4	£75.8
2024	£30.0	£89.5
Total (PV)	**£97.4**	**£290.1**

The table above shows the Net Present Value (NPV) of the annual savings they are estimated to generate: between £97 million and £290 million over the 10 year evaluation period, depending on the achieved sales growth rate. The NPV business benefits are estimated at £2.6m to £10m.

Benefits - commercial EAPC tricycles

5.27 By removing the 60 kg weight limit for EAPC tricycles, stakeholders are clear in their view that Option 1 would also be likely to stimulate growth in the goods-delivery cycle market. It may also stimulate growth in the pedicab market but other external legislative and political factors may continue to act as barriers to pedicab services. **For this impact assessment it is assumed that any effects on pedicab services would be negligible.**

5.28 Notwithstanding stakeholders' advice on the goods-delivery market, data is not readily available to enable a robust forecast of benefits to be provided. Data on current delivery bike use is very limited, and only a single stakeholder provided an estimate of the potential impact on the market. Given the deregulatory framework of the proposals overall, it is not considered proportionate to undertake further bespoke research - especially as the impact may vary significantly by location. However, from existing data, it is reasonable to expect that some savings in operating and congestion costs will be derived. **In view of the uncertainties, this Impact Assessment excludes the following illustrative forecast benefits; the calculations produced below are NOT included in the main cost and benefit calculations.**

Calculation of van-km journeys substituted

5.29 The consultation process was used to attempt to get data on the likely take up of commercial EAPC tricycles and the vehicles they displace. *Cyclelogistics (2012)* suggests that goods-delivery bikes (conventional and electrically assisted) could potentially substitute for about 40% of all urban journeys performed by van or truck (as well as a similar proportion of such journeys by private car or bus). They based estimates of fuel and CO_2 benefits on what they surmised to be very conservative assumptions that such cycles would actually displace only 1 thousandth of that potential by 2020, based on expectations of “only a small change in behaviour over the next few years”. They also pointed out the likely variability across Europe, with Copenhagen stated as already having 35,000 cargo bikes in use as an example.

5.30 *GB statistics (Department for Transport, 2012b)* indicate that light vans and goods vehicles travelled about 28 billion kilometres in urban areas in 2010 (light vans accounting for 24 billion). If the maximum potential is for EAPC tricycles to replace 40% of that figure, that equates to 11.2 billion km. If just one in every 1,000 of these were replaced by a cargo cycle, this would be equivalent to 11.2 million vehicle km – this is taken as an upper bound estimate of van take up. The lower bound estimate of increased van take up is assumed to be zero, with a central estimate as a mid-point to ensure a conservative estimate of overall benefits. The evidence suggests that cargo bikes are gaining in application in the UK, though still very rare, but their growth is likely to be seriously constrained, particularly in hilly areas. Under Do Nothing, therefore, it seems reasonable to assume that there would be no significant growth in goods-delivery cycle services. Allowing electrical assistance (Option 1), would be likely to open up new markets and new towns and cities. By 2020 it is assumed that a maximum of 11 million van kilometres could be substituted per annum, rising to 20 million km by 2024. Linear growth is assumed for the intervening years. It is acknowledged that these estimates are subject to considerable uncertainty, but the forecast appears reasonable and conservative, and represents the best independent forecast of uptake available.

5.31 Assuming a one-for-one replacement, 11 million vehicle km by cargo bike would take about 1,000 vans off the road, i.e. about 0.03% of the 3 million or so vans in use in Great Britain. Although vans can carry more load, bikes can specialise in short trips and get through traffic more easily to be able to re-load at the depot/base more frequently, so overall productivity is likely to be quite similar and, therefore, a one-for-one substitution is feasible.

Table 10: reduction in van vkms from introduction of electrically assisted cargo tricycles

	Low	High
2014	-	-
2015	-	1,833,333
2016	-	3,666,667
2017	-	5,500,000
2018	-	7,333,333
2019	-	9,166,667
2020	-	11,000,000
2021	-	13,250,000
2022	-	15,500,000
2023	-	17,750,000
2024	-	20,000,000

Calculation of operating cost savings resulting from switch from van to EAPC

5.32 Publicly available industry estimates of van running costs typically vary between about 40p and 80p per mile. While webTAG, for example, indicates average marginal running costs for light goods vehicles to be around 50% higher than cars, the sorts of vans that cargo cycles are most likely to replace would naturally tend to be the smaller, car-derived and similarly sized vehicles, which are likely to have fuel consumption and other costs similar to cars. It is therefore appropriate to use the same costs for vans as were used for cars in the assessment of EAPC impacts, i.e. 60p per mile (rounded to 38p per km). An electrically assisted cargo cycle would cost somewhat less than a van, both to purchase and to run. Figures published by the *Cyclelogistics* project indicate costs of less than 8p per mile, based on a £2,000 purchase cost, 4 year life and 10,000 miles per year (about 40 miles per working day) – note the much higher annual mileage of cargo bikes in comparison to EAPC bicycles which reduces estimated cost per km. EAPC variants may well cost about £1,000 more (about the same differential as with conventional bicycles and EAPCs), but even assuming they don't have any longer life expectancy, costs would still only be about 10p per mile. This figure (rounded to 6p per km) gives a net saving for each kilometre substituted of 32p (38 – 6).

Table 11: operator cost savings from move to electrically assisted tricycles (£m)

	Business cost savings	
	Low	High
2014	£0.0	£0.0
2015	£0.0	£0.6
2016	£0.0	£1.2
2017	£0.0	£1.8
2018	£0.0	£2.3
2019	£0.0	£2.9
2020	£0.0	£3.5
2021	£0.0	£4.2
2022	£0.0	£5.0
2023	£0.0	£5.7
2024	£0.0	£6.4
Total (PV)	**£0**	**£26**

Calculation of external benefits of reduced van vehicle kms

5.33 As noted earlier, WebTAG provides estimates for the value of reduced vehicle kms that can be applied to van calculations used here. (The values for 2015 are reported in an earlier table.) Applying these values to the estimated reduction in van kms results in the following benefits.

Table 12: external benefits of reduced van kms (£m)

	Congestion business		Congestion consumer		Other non-business	
	Low	High	Low	High	Low	High
2014	£0.0	£0.0	£0.0	£0.0	£0.0	£0.0
2015	£0.0	£0.1	£0.0	£0.1	£0.0	-£0.1
2016	£0.0	£0.2	£0.0	£0.3	£0.0	-£0.1
2017	£0.0	£0.4	£0.0	£0.4	£0.0	-£0.2
2018	£0.0	£0.5	£0.0	£0.6	£0.0	-£0.3
2019	£0.0	£0.6	£0.0	£0.8	£0.0	-£0.4
2020	£0.0	£0.8	£0.0	£1.0	£0.0	-£0.4
2021	£0.0	£1.0	£0.0	£1.3	£0.0	-£0.5
2022	£0.0	£1.3	£0.0	£1.6	£0.0	-£0.6
2023	£0.0	£1.5	£0.0	£2.0	£0.0	-£0.6

2024	£0.0	£1.8	£0.0	£2.3	£0.0	-£0.7
Total (PV)	**£0.00**	**£6.48**	**£0.00**	**£8.25**	**£0.00**	**-£3.03**

Health benefits

5.34 The health benefits cannot be properly calculated using the HEAT methodology, as described for the EAPC assessment, because the average distances cycled per day would exceed the model's limitations (it is designed for more occasional, leisure or commuter journeys). If each cargo cyclist replaces one van, and cycles about 10,000 miles per annum (16,000 km), this would indicate an average daily ride of about 65-70 km, whereas the model is only valid for average daily trips of about 12 km or less. While cycle delivery operations would naturally tend to enhance the fitness and basic health of the rider, they may also expose them to stresses associated with meeting delivery deadlines and getting through traffic, as well as operate in dense urban centres where air quality is poor. **Overall, therefore, the impact assessment takes a conservative approach and assumes zero health benefits for cargo cycle operations.**

5.35 In total, therefore, electrically-assisted cargo cycles are reckoned to generate the following net savings:

Table 13: total benefits from switching commercial van delivery to electric cargo bikes (£m)

	Total Benefits		Of which business benefits	
	Low	High	Low	High
2014	£0.0	£0.0	£0.0	£0.0
2015	£0.0	£0.8	£0.0	£0.7
2016	£0.0	£1.5	£0.0	£1.4
2017	£0.0	£2.3	£0.0	£2.1
2018	£0.0	£3.2	£0.0	£2.8
2019	£0.0	£4.0	£0.0	£3.6
2020	£0.0	£4.9	£0.0	£4.3
2021	£0.0	£6.1	£0.0	£5.3
2022	£0.0	£7.3	£0.0	£6.2
2023	£0.0	£8.6	£0.0	£7.2
2024	£0.0	£9.9	£0.0	£8.2
Total (PV)	**£0.0**	**£38.1**	**£0.0**	**£32.9**

The Table above shows the illustrative Net Present Value (NPV) over the evaluation period of 2015-2024 ranges from £0m to £38m. Of this business benefits range from £0m to £33m. As explained in para [5.21], these figures have not been included in the IA's net monetised benefit calculation.

5.36 The references in the above paragraphs are:

AA (2012). *Motoring costs 2012*. The Automobile Association, June 2012.

Colibi-Coliped (2012). *European bicycle market, 2012 edition*. www.coliped.com, accessed March 2013.

Cycle*logistics* (2012). *Cyclelogistics – moving Europe forward*. Retrieved from www.cyclelogistics.eu, February 2013.

Department for Transport (2012b). *Transport statistics Great Britain, 2012*. Department for Transport, London, December 2012.

European Commission (2010) Future of Transport Analytical Report, Eurobarometer

Eurostat Population Data (2012)

GoSmarter (2013). *Cycling costs*. http://www.gosmarter.co.uk/cycling-costs.aspx, accessed February 2013.

Leeds University report: 'The New Generation of Private Vehicles in the UK. Should their use be encouraged and can they attract drivers of conventional cars?' (Neil Guthrie 2001)

LSE (2011). *The British cycling economy, 'gross cycling product' report*. Dr Alexander Grous, Centre of Economic Performance, London School of Economics, 2011.

DfT statistics, (NTS0314) Bicycle and motorcycle trips per rider per week: England, since 2002 https://www.gov.uk/government/statistical-data-sets/nts03-modal-comparisons

ONS, Annual Business Survey - Provisional Results 2013, Division 47

PRESTO (2010b). PRESTO cycling policy guide, electric bicycles. Annick Roetynck, PRESTO (Promoting Cycling for Everyone as a Daily Transport Mode), February 2010.

Transport Research Laboratory report: 'New Cycle Owners: expectations and experiences' (Davies and Hartley 1998)

6. Wider Impacts

6.1. Competition Assessment

In view of the deregulatory nature of the preferred option, which does not entail any costs, it is considered that there are no competition impacts.

6.2. Small and Micro Business Assessment

This measure is beneficial to business. Therefore, no businesses are exempt from this measure to ensure that the full range of businesses can benefit.

6.3. Equalities Assessment

It is considered that there are no race, gender or disability equality impacts to the preferred option.

6.4. Policy Review

As the preferred option is deregulatory, review after a particular period is not considered necessary.

7. Summary

7.1 The EAPC Regulations which are currently in force in Great Britain set requirements which powered cycles must meet in order to be legally classified as EAPCs. These requirements limit the power of the motor assist function, the maximum speed at which assistance can be provided and include a maximum unladen weight limit. In addition, cycles with a 'twist and go' facility are not specifically prohibited from being classified as EAPCs provided they meet the power, speed and weight criteria specified.

The current BS-EN EPAC standard and the EU Motorcycle type approval framework Regulation 168/2013 allow for a higher level of power than GB Regulations do for bicycles and do not specify any weight limits.

Following consultation, Red Tape Challenge Review and stakeholder analysis, two options have emerged:

Do Nothing

Option 1 (Preferred Option) Amend the Regulations to recognise the technological and societal developments since 1983; harmonise GB requirements with the EU market; and minimise the risk of barrier-to-trade legal challenge.

7.2 Pending validation of the Impact Assessment, the draft regulations will be finalised for Parliamentary assent.

Annex A – Calculations of the proportion of congestion benefits that fall on business

Data from WebTAG can be used to estimate the proportion of benefits from reduced congestion which fall on business. This is estimated based on estimates of the value of time of business and consumer trips and the proportion of journeys made by businesses, to estimate the business contribution to vehicle average cost of time by mode (e.g. bus, car). This is combined with data on the mileage of different vehicle types, and the average value of time of different modes to estimate the mode contribution to the vehicle average cost of time. These can then be combined to estimate the business contribution to the average vehicle cost of time.

WebTAG publishes estimates of the value of time by different mode, and the proportion of journeys (for each mode) used by business. This can be used to estimate the business contribution to vehicle average cost of time for each mode.

Table A1: business contribution to vehicle average cost of time by vehicle type

		Value of time (£ / hr)	Proportion of journeys by business	Business Contribution to vehicle average cost of time
Car	Work	31.0	13%	**32%**
	Average	12.7		
Light goods vehicle	Work (freight)	14.6	88%	**91%**
	Average	14.1		
Other goods vehicle	Work	14.4	100%	**100%**
Public service vehicle	Work	20.5	22%	**22%**
	Total	94.1		

The IA then needs to estimate the mode contribution to the vehicle average cost of time. WebTAG provides estimates of the average value of time per vehicle, and DfT has estimates of the mileage of different modes. These are multiplied together to estimate the contribution of each mode to the vehicle average cost of time.

Table A2: business contribution to the average vehicles cost of time

	Average Value of time (£/hr)	Vehicle miles	Average contribution by mode to vehicle average value of time (£/hr)	%
Car	12.73	80%	10.1	74%
Light goods vehicle	14.06	14%	2.0	14%
Other goods vehicle	14.35	5%	0.7	5%
Public service vehicle	94.06	1%	0.9	6%
Total		100%	13.8	100%

Multiplying the business contribution to vehicle average cost of time by mode, by the mode contribution to the vehicle average cost of time gives the business contribution to the vehicle average cost of time. This is the figure applied in the IA - 44%.

Table A3: business contribution to the vehicle average cost of time

	%
Car	24%
Light goods vehicle	13%
Other goods vehicle	5%
Public service vehicle	1%
Total	**44%**