

**Opinion of the European Economic and Social Committee on the subject 'Toward the wider uptake of electric vehicles'**

**(exploratory opinion on request of the Belgian presidency)**

(2011/C 44/08)

Rapporteur: **Mr OSBORN**

On 9 February 2010, the Belgian EU Presidency decided to consult the European Economic and Social Committee, under Article 304 of the Treaty on the Functioning of the European Union, on the subject

*Toward the wider uptake of electric vehicles (exploratory opinion).*

The Section for Transport, Energy, Infrastructure and the Information Society, which was responsible for preparing the Committee's work on the subject, adopted its opinion on 1 June 2010.

At its 464<sup>th</sup> plenary session, held on 14 and 15 July 2010 (meeting of 14 July), the European Economic and Social Committee adopted the following opinion by 155 votes to 2 with 4 abstentions.

## 1. Summary and recommendations

1.1 The EESC strongly supports moves in Europe towards the wider uptake of electric vehicles (EVs), and particularly of electric cars. This is urgent both as a contribution towards reducing greenhouse gas emissions from the transport sector and as reducing Europe's dependence on increasingly less secure imports of oil.

1.2 The EESC supports all the actions proposed by the Commission in its recent communication on clean and energy efficient vehicles. It also recommends several further actions by the European Union and its member states.

1.3 On the technological side the EESC recommends a number of priorities for R & D, for acceleration of key standardisation programmes, for expanding relevant skills and training programmes, and for managing and smoothing changes in the pattern of employment in the car sector and associated sectors.

1.4 The EESC emphasises that the transition to EVs can only achieve greenhouse gas emissions reduction if the electricity for the vehicle itself comes from low or zero carbon sources. Therefore the transition to EVs must be matched by a parallel additional switch of electricity generation in the low carbon direction.

1.5 The widespread use of EVs and the substantial electric storage capacity which their batteries collectively represent might play a significant role in helping to optimise the balance of supply and demand in the electricity supply system if smart technology is introduced into the management of the grid and into the recharging infrastructure for EVs. The EESC notes that this would be complex to organise; but it recommends urgent studies and projects in order to try to turn this possibility into a major linked win-win opportunity for both the transport sector and the electricity supply sector.

1.6 Rapid transition to EVs in the car sector will require major concerted efforts by the car industry, by new providers of recharging infrastructure, by the public sector as regulators, standard setters, incentivisers and educators – and by the public as intelligent, concerned but demanding consumers of the new technology. The EESC urges the European Union and its Member States to launch a major collective effort to promote and support this crucial transition by all the means in their power, and to ensure that Europe does not fall behind the rapidly developing foreign competition in this key sector.

## 2. General Comments

2.1 The transport sector as a whole is still showing continuing increases in CO<sub>2</sub> emissions from year to year in spite of gradually improving efficiency standards in all types of transport. If transport is to make an adequate contribution to the carbon reductions that Europe has committed to by 2050 it will not be sufficient to rely on incremental efficiency savings in each transport mode.

2.2 For road transport there are fundamental physical limits to the extent to which the carbon performance of the internal combustion engine can be improved. At a certain point further improvements will require a fundamental transformational shift to new low carbon or zero carbon emission power sources.

2.3 Amongst the various possibilities for achieving this, an early transition in the private car sector looks the most promising, proceeding via hybrids to all electric vehicles (EVs) as soon as possible.

2.4 There are several reasons for moving as fast as possible:

- Reducing carbon emissions earlier rather than later will show better returns in mitigating climate change, and avoiding expensive adaptation measures in the future.
- There will be substantial up-front costs both for the private sector (motor manufacturers, battery makers, infrastructure providers etc.) and for the public sector (R and D, infrastructure, incentive payments etc.) in the early stages of the transition, and the faster the change can take place the more quickly the investments will show an economic return.
- There is growing interest amongst consumers in low or zero carbon vehicles which could present a golden opportunity for Europe and its member states to come forward as the champion of what could be a popular transition if it is handled right, and provided that the new vehicles can match the standards of safety, convenience, performance, reliability, design and price of its traditional rivals.
- Major competitors (the USA, Japan, China and others) are already making major investments in the field of EVs, and could gain an enormous head start and competitive advantage if Europe does not move equally fast.
- If Europe move quickly enough to promote the development of EV in Europe together with linked changes in power supply and the grid system the expansion of these sectors could be major engines of economic growth, job creation and export expansion for Europe. Conversely lagging behind in this transition could seriously weaken the European economy.

2.5 Against this background the EESC welcomes the intensive activity currently under way in the Commission, the Council and the member states to support and accelerate the transition to EVs. It recommends further European action under three main heads:

- Further support for the technological transition through R&D, deployment programmes, education and training.
- Support for the necessary parallel development of the electricity sector including expansion of renewables, grid and infrastructure development, and standardisation of the interface between EVs and electricity supply.
- Support for transformation of the market with appropriate incentives so as to ensure that demand keeps pace with the transformation of the supply of vehicles.

### 3. Support for the technological transition

#### 3.1 *Research and development*

3.1.1 A major effort is needed to increase R&D towards the 3 % target and to devote more of the programmes to

supporting the transition to the low carbon economy. The EESC welcomes the importance attached to expanding R&D efforts generally in the new 2020 strategy, and the especial importance given to supporting the transition to a greener economy, including the transition to low carbon and electric vehicles. Particular attention needs to be given to:

- Further improvement of battery technology so as to extend the range of EVs, and improve the robustness and resilience of the systems chosen for all weather and driving conditions.
- Alternative methods of managing recharging so as to optimise the methods eventually selected for standardisation.
- Ways of associating the expansion of electric vehicles with expansion of renewable or low carbon sources of electricity supply.
- Ways of using smart metering and a re-engineered grid system to enable batteries to be recharged at optimal times from the point of view of electricity load balancing.
- The global supply of materials that will be needed for a massive expansion of batteries, particularly lithium and rare earths, and any steps that could be taken either to augment or make more secure the sources of supply, or to substitute other more widely available materials.
- Steps that should be taken at the outset to promote maximum reuse of materials from end of life vehicles and end-of life batteries.

3.1.2 Particular attention needs to be given to demonstration projects and other deployment programmes. Experience with the Energy Technology Platforms needs to be expanded and developed into proactive deployment programmes for the roll-out of plug-in hybrids and all-electric cars and the infrastructure support they will need. Demonstration projects in individual cities and regions that are willing to put themselves forward as pilots (which have already started in some European cities and regions) should be actively encouraged with appropriate incentives. The CIVITAS programme needs to be expanded.

3.1.3 The EESC is concerned that current battery technology is heavily dependent on materials (lithium and rare earths) that are currently produced mainly or solely in China. It urges urgent research and geological surveys to identify alternative sources of supply of such materials and to encourage recycling of them wherever possible.

### 3.2 Standard setting

3.2.1 Regulatory standards for minimum energy efficiency requirements for products and services have a crucial part to play. The EU has already established standards for CO<sub>2</sub> emissions from cars, with timetables laid down for further improvements to be mandated in the future. But these programmes still need to be made more comprehensive and to set more ambitious short and longer term targets.

3.2.2 The present emission limits established for (2015) allow a super credit for low carbon or electric vehicles. This operates as a significant incentive to European manufacturers to accelerate their development and roll-out of the first generation of all-electric cars. But at the same time it reduces the incentive on them to seek further improvements from the remaining fossil-fuel powered cars. Perhaps at the next revision a separate specific target for the expansion of the electrically powered fleet might be set; while at the same time manufacturers should also be required to continue to improve the CO<sub>2</sub> performance of their petrol and diesel vehicles, which will inevitably remain a major part of the fleet for the next 20 years.

3.2.3 It is essential that pressure is maintained on European industry to be amongst the world leaders on EVs so that they can maintain a strong competitive position as the whole world market moves in this direction. There is keen competition between the industry players in the motor industry, battery industry and energy supply industry to develop the best technologies at the keenest prices. This competition is itself a powerful driver for innovation and should not be inhibited.

3.2.4 On the other hand the EU will clearly need to promote some early elements of standardisation, so as to ensure safety, reliability, and compatibility, particularly in the supporting infrastructure for recharging EVs and the plug-in arrangements, and also in the power requirements and configuration of battery sets. Since cars (new and second hand) are also traded extensively between Europe and the rest of the world the EU should also participate actively in work to establish global standards on these matters in order to ensure compatibility of EV technology on a world scale.

### 3.3 Education, professional and technical training

3.3.1 Moving to a car industry dominated by EVs will bring a change in employment patterns within the industry. If production and jobs are to be retained in the European car industry and a strong export performance maintained it is essential that early investments be made in the European production capacity for EVs, and that corresponding training and retraining in the new skills that will be needed in all

sectors of the industry (design, production, distribution, sales, maintenance, disposal etc.) be put in place.

3.3.2 The EESC strongly supports the Commission's proposal to relaunch the CARS 21 High Level Group with extended stakeholder involvement to address the barriers to market uptake of the new technologies. The EESC recommends that this should include a specific social issues working group, and that steps should immediately be taken to develop and reorientate sectoral training and education structures to meet emerging skills needs resulting from EV technology.

## 4. Parallel transformation of electricity supply and linkages with the decarbonisation of electricity supply

4.1 Changing over to EVs will represent a significant extra demand on electricity supply – not very large at first, but ultimately substantial. If this additional electricity demand were met by constructing additional old-fashioned coal fired power stations there would be no gain in terms of CO<sub>2</sub> production. CO<sub>2</sub> emissions would simply have been shifted from cars to power stations. It is therefore essential that the expansion of electric cars marches side by side with further expansion of low carbon or zero carbon power supply.

4.2 Programmes for expansion of renewable energy need to be accelerated in parallel with the increased electricity demand for electric cars. This requirement should be built into the next review of targets for expansion of renewable energy.

4.3 A more sophisticated complementarity between the expansion of the total battery capacity needed for electric vehicles and the growth of the share of electricity supply from renewable sources is beginning to emerge.

4.4 A major problem for the expansion of renewables is the intermittency of supply of wind, solar energy, tides etc. In order to match the differently fluctuating pattern of demand for electricity there will probably have to be an expansion of the means of storing energy. Batteries for cars will only be needed in cars for the limited amount of time that people are actually driving. In between those times they will need to be recharged but could also potentially be available as reserve sources of energy for giving extra reserves to the grid when renewable supplies fall short. The technical and logistical problems of making this match are formidable. But as a smart interconnected grid develops this possibility will become more feasible. The EESC urges the Commission to put the necessary studies urgently in hand, and to ensure that the recharging infrastructure that is developed for EVs is made sufficiently smart from the outset to enable this complementarity with renewable energy supply to be achieved.

4.5 The development of infrastructure for recharging and/or battery replacement will require major investment. Facilities for recharging will need to be made widely available, e.g. at car parking spaces, at people's homes, at workplaces, at retail outlets, at commercial garages, at other public gathering places, and in the streets. The public sector will need to establish a regulatory framework that will ensure that those undertaking the infrastructure investments can secure a reasonable return, at the same time as preventing excessive prices. The EESC recommends that the Commission should undertake urgent studies of appropriate regulatory frameworks that will encourage the necessary infrastructure investment. In this context it notes and supports the conclusions of the Competitiveness Council on 26 May which called for rapid development of a European standard for electric vehicles to speed up their uptake.

## 5. Consumers and the market

5.1 The European public is increasingly aware that the age of relying on the general availability of cheap oil is coming to an end. They are becoming aware that oil is becoming harder to find and to recover in many parts of the world, and that there is growing competition for what is available from the emerging economies. In spite of some scepticism there is also a growing awareness that emissions of CO<sub>2</sub> need to be reduced to avoid damaging climate change, and that the transport sector will have to play its part in achieving this. To varying extents in the different member states, governments have further reinforced these messages by taxing petroleum products, by differentiating the taxation of vehicles so as to favour smaller lower carbon emitting vehicles over gas guzzlers, and in some cases by purchasing hybrids and prototype electric cars for their own fleets.

5.2 Following from this general awareness there has been some shift in the market in recent years. Consumers have shifted their preferences significantly towards smaller, lower carbon emitting vehicles and away from larger high emitting models. There has been some demand for the hybrids that have so far been introduced, particularly where member states have encouraged this by fiscal incentives. In general however consumers tend to be cautious about new innovations in this sector, and they will probably need reassurance and incentives to move decisively towards the next generation of plug in hybrids and all-electric vehicles as they become available.

5.3 Manufacturers and the oil industry have similarly been cautious about the potential for shifting towards EVs. They need to be convinced of the inevitability of moving in this direction, and of the political determination of the European Union to drive and accelerate this transition in order to put the full weight of their resources and expertise behind making the change, and selling it to the consumer. The EU and its member states need to make the necessity and urgency of this transition crystal clear to their industries, and not to

allow special pleading by some of the slower businesses to slow down general progress, which could only result in the industry as a whole being overtaken by faster moving businesses in other parts of the world, and a permanent loss of market share and influence in the evolution of standards worldwide.

5.4 In order to move successfully to the next stage and to build consumer confidence and demand there are several requirements from the consumer side, which may be summed up under the following main heads – safety, reliability, performance and design, range and flexibility, convenience of recharging, price at purchase and in use. (There is also some concern that electric vehicles may be dangerously quiet on the roads – if so some minimum added noise levels may need to be prescribed in order to give pedestrians and other road users some audible warning of an approaching vehicle.)

5.5 It will be crucial that EVs are at least as safe as conventional vehicles (both in normal driving and in the event of an accident), both in objective statistical measurements and in perception. Recharging arrangements, particularly any publicly accessible recharging facilities, will also need to be made safe against tampering and fraud. These criteria should be incorporated in all the regulatory requirements for safety that will need to be imposed on electric vehicles.

5.6 EVs will need to be reliable at all times and in all weather conditions. If batteries go flat easily or if certain weather conditions reduce performance or range markedly the public will easily be disillusioned. It would be desirable to build standards for durability and reliability into the regulatory framework.

5.7 Performance of EVs should at least match those of a mid-range family car as these are the cars that most of the population are familiar with. Similarly it will be important that the design and configuration of EVs are no less attractive to the public than the best ICVs. This of course is a challenge for industry to meet, and will not need regulatory action, provided that industry itself is properly motivated (and if necessary incentivised) to want to accelerate the change.

5.8 Range is intimately connected with recharging arrangements. If recharging requires a period of several hours in a garage or at a street charging point then consumers are likely to want a substantial range to be available from each charge-up. It may well be that most people only travel modest distance in the course of a normal working day – but they will want longer to be available for the occasions when they have further to travel – and will not want to be held up for hours for recharging in the course of such journeys. Batteries will sometimes go flat when a car is not at a recharging point. Arrangements for emergency recharging at the roadside or battery replacement will need to be developed.

5.9 Swifter recharging seems to be becoming a technical possibility. But unless the time could be reduced to something like the time that it takes to fill up a tank of petrol busy people will be impatient. In our view manufacturers ought to be aiming to increase available range as soon as possible to 300km if they want to ensure a sizeable market. R & D efforts should be particularly focused on this objective.

5.10 If such a range is not likely to be attainable for some years the EESC recommends that close attention be given to supplementing plug-in recharging arrangements with facilities for swiftly replacing the whole battery unit at a commercial garage (or in emergencies at the roadside) in two or three minutes. The EESC understands that some early trial projects are being developed on this basis. In order to facilitate the development of infrastructure for battery switching in this way the EESC recommends that the Commission give early attention to the possibility of achieving early standardisation of the configuration and characteristics for battery packs and how they can be removed and replaced conveniently. Battery switching would also be facilitated if the battery pack were leased from a service company handling the switching arrangements rather than being purchased outright. Such an arrangement would lower the initial cost of EVs; but it might be necessary to establish a regulatory framework in order to ensure that fair prices and good operating standards are maintained by the service companies.

5.11 Where plug-in recharging is to be used it will be essential that it swiftly becomes available at a widespread network of charging points. In addition to facilities at people's homes there will need to be recharging points at car parks (public and private, workplaces, retail outlets etc.), and at street parking bays. In order to make this a manageable programme it may be that early introduction efforts should focus on specific geographical areas. It might be useful to conduct pilot schemes in various settings including island, large cities and their regional hinterlands, smaller urban settings, rural areas etc. so as to establish what the crucial modalities for operating and infrastructure support are. Wherever EVs are pioneered it is essential that an adequate network of recharging facilities be established at the outset. Consumers will swiftly turn against the new technology unless they feel that it is well supported by widely available recharging and battery switching facilities from Day 1.

5.12 Municipal, local and regional authorities will have a crucial part to play in promoting take-up of EVs in their areas. They can help to identify appropriate sites for recharging and battery switching facilities. They could give preferential status to EVs for parking or in reserved lanes. They could play a significant role in publicising and encouraging the tran-

sition to EVs. They could also encourage by using electric vehicles for transporting those with mobility challenges, street cleaning, etc. as many such trips only involve short distances within the authority's area.

5.13 Price at purchase and in use will of course be crucial. The transition from leaded to unleaded petrol in many countries provides a powerful example. There was consumer resistance to making this change for some time. But as soon as governments used fiscal differentials to favour lead-free petrol the resistance dropped away and the change over took place swiftly and rapidly.

5.14 For encouraging take-up of electric vehicles it will similarly be necessary at least to eliminate any cost advantage of petroleum vehicles by suitable differential tax regimes, and probably to give a preference to EVs in the early years to get the market moving. In principle EVs should be cheaper to operate because of the much greater efficiency of the electric engine. But of course much will depend on the structure of electricity tariffs, and whether recharging batteries can be integrated into a smart system for balancing loads at a preferential tariff. The EESC urges that early econometric studies be made of the various possibilities here. Since the shift to an EV is a big step for a consumer to take it may need to be strongly incentivised, particularly in the early years of the transition (e.g. by a big purchase tax differential favouring EVs against ICVs).

5.15 In addition to price incentives Governments and local authorities need to explore other forms of incentive that could assist the transition, including dedicated routes or zones and preferential parking facilities for EVs. EVs will clearly be less polluting than internal combustion engines, and some versions might also have a part to play in reducing congestion (e.g. smaller EVs for particular purposes).

5.16 In addition to action to ensure that EVs can be marketed at competitive prices it will be important to take further measures to improve consumer understanding of the carbon footprint of their transport decisions, and the extent to which they will be improving their carbon footprint by switching to EVs.

5.17 Such information should be based on a full life cycle analysis of the impact of their cars and other modes of transport. But even when the whole life cycle is taken into account it seems probable that the switch to an electric car will be one of the single biggest decisions that an individual will be able to make to reduce his or her carbon footprint. They need the right information in order to be able to assess this accurately.

5.18 Some sectors of the market will probably be easier to enter initially than others. Given the current range limitations, and recharging times, EVs will initially at least be more suitable for short urban or local journeys and less suitable for longer distance runs. Similarly plug in facilities will be easier to provide in homes that have garages or at least private parking spaces for their cars. Early marketing efforts might therefore be expected to focus on households that have such facilities, who may consider purchasing an electric vehicle as a second (smaller) runabout for local use, while maintaining a larger ICV or hybrid for longer journeys with greater loads. Even for these uses research appears to imply that restricted driving ranges and length of recharging time may limit initial take-up; so in order to avoid EVs being confined to a few small niche markets it will be important to establish from the outset a longer term vision of a more complete transition that will make electric vehicles an attractive option to all users for all journeys.

5.19 Public procurement programmes can be an enormously powerful tool in driving improvement of standards in key industry sectors. The public sector is an important purchaser of cars and other vehicles; and the example set by the public sector can have an additional influence on the purchasing decisions of others. It is therefore important that governments and other public sector bodies including regional and local authorities throughout Europe should make early commitments to purchase electric cars and other vehicles, so as to provide an early boost to the market for these vehicles, and get production volumes quickly towards the critical mass for economic production. The European Union institutions could lead the way in their own purchasing decisions, and could initiate Europe-wide discussions and initiatives to promote early

uptake of electric vehicles. Political leaders and other prominent public figures could spread the message by making early use of electric vehicles themselves.

5.20 It is estimated that almost (50 %) of cars purchased in Europe are purchased under schemes managed or supported by companies for their employees. It would be desirable to incentivise companies to give preference to low carbon or all electric cars in their schemes through appropriate fiscal differentiation.

## 6. Other vehicles and forms of transport

6.1 In this opinion we have focused primarily on the private passenger car, and the steps that Europe needs to take now to accelerate the transition towards using electric cars in the future. This is the lowest hanging fruit on the transport decarbonisation tree.

6.2 But of course the scope for electrification does not end there. Policy makers and industry need to be alive to the potential for further electrification in the whole range of surface and marine transport, including very small one person vehicles, larger public service vehicles, railways, trams and trolley buses, and the whole field of freight. Moreover as electrification of the transport system spreads further new patterns of mobility may emerge that are facilitated by the different characteristics of electric power, battery technology and smart systems of grid and traffic management. Here too the EESC encourages the Commission and policy makers to be attentive and watchful for the best ideas that need encouragement.

Brussels, 14 July 2010.

*The President*  
*of the European Economic and Social Committee*  
Mario SEPI

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