

Briefing Electrification strategy: a shift to sustainable e-mobility**Summary**

This paper sets out why a cross-vehicle, cross-modal strategy to accelerate the electrification of transport – a shift towards sustainable e-mobility – should be an essential part of Europe’s ambition to achieve an energy union but also to attain the benefits of reduced oil imports and transport CO2 emissions as well as stimulate innovation and jobs.

Europe spends around €300 billion a year on oil imports, most of it to keep transport wheels turning. A third of it comes from Russia and another third from the Middle East. Burning this oil in transport leads to it being the single biggest emitter of CO2 in Europe; its 2012 share, including aviation and shipping, was 31%. But policies to reduce transport emissions from cars are starting to work. The inexorable rise in transport CO2 ended in 2007 and since then CO2 emissions and oil use have fallen by around 10%. Analysis shows this is not just due to the crisis.

Putting Europe on the pathway advocated in the transport White Paper requires a 60% cut in CO2 by 2050, almost 70% from today’s levels – a 3% reduction per year. Improving vehicle efficiency is one key mechanism to deliver these cuts, but this must be complemented by a comprehensive strategy for sustainable e-mobility.

Why electric, not technology neutrality?

Europe has long favoured ‘technology neutrality’ in its attempts to reduce energy use and CO2 emissions from transport. But, for reasons outlined here, technology neutrality has failed and should be replaced by a concerted effort to develop e-mobility.

First, technology neutral transport fuels policy has failed. The Renewable Energy Directive (RED) and Fuel Quality Directive (FQD) do not incentivise low-carbon fuels. Industry lobbies have undermined scientifically-robust carbon footprinting of fuels, notably higher default lifecycle greenhouse gas values for petrol and diesel made from unconventional oil sources and emissions caused by indirect land-use change (ILUC) from biofuels.

Second, technology-neutral policies cannot drive systemic and transformational changes, only incremental shifts. The current monopoly of liquid, carbon-containing fuels for transport will not be broken by technology-neutral policies. The barriers to entry of alternatives, unattractive economies of scale, and the chicken-egg dilemma of vehicles versus refuelling/recharging infrastructure prevent competition and choice. Proactive policies that break that monopoly in favour of a cleaner alternative are essential and justified.

There are five reasons why Europe should now choose to accelerate the transition toward sustainable electric transport or e-mobility:

1. **Environment:** Electrification is the only credible option left for *deep* decarbonisation of surface transport. Electricity is now already a significantly cleaner power source than oil, and will become more so in coming decades. In recent years around 70% of additional electricity generation capacity has consisted of solar and wind power. Sustainable e-mobility can help clean up electricity by providing a storage option, stabilising the grid. In contrast, much of the oil industry’s investment goes into ever

riskier and/or higher carbon ventures such as deep sea drilling, Arctic oil and oil from unconventional sources, such as tar sands;

2. **Energy concerns:** Electric traction is inherently more energy efficient than other options. And from an energy diversity and dependence perspective, electricity is superior to oil, gas or biofuels that are largely imported. It can draw from a wide variety of energy sources, with an unmatched potential for domestic production, especially from wind and solar;¹
3. **Alternatives have lost credibility:** *Natural gas* is not a low-carbon solution and now seems a less astute choice from an energy security perspective. *Biofuels* have huge and, as yet unresolved, sustainability challenges, especially if agricultural land – increasingly a scarce resource – has to be used to grow them. They are unlikely to provide more than a niche solution in the sectors most difficult to decarbonise. *Hydrogen* may be part of future e-mobility but efficiency issues have yet to be addressed.
4. **Trends:** E-mobility can reinforce trends towards sustainable transport. The economics of electric vehicles – high fixed costs, low variable costs – help vehicle sharing. Electrification also includes a push for more attractive rail. Thirdly, electric traction is well suited for small and light vehicles such as e-bikes, e-scooters, and small quadricycles that are quickly becoming more popular;
5. **Innovation and competitiveness:** Europe is falling behind in the global race to electrified transport with Japan and Korea in the lead, China catching up quickly and the US investing heavily. These countries are choosing petrol hybrid, plug-in and, ultimately, full electric vehicles for future vehicle powertrains. If Europe sticks mostly to diesel, the risk to the global competitiveness of the European automotive industry is real.

A shift to electrification of transport is a bold and appealing vision for transport in the energy union, moving away from polluting, imported oil to clean indigenously-generated electricity and, in the process, stimulating jobs, growth and sustainable mobility choices. As the energy union takes shape, the Commission can now take the chance to strengthen its role in realising these objectives. Electric mobility has been identified as a priority area by the October 2014 European Council and for the “European industrial renaissance”, and already consumes the resources of almost a dozen DGs and other EU bodies.² But actions have so far remained piecemeal, lack visibility and are often not well coordinated. Coordinated action from multiple DGs (most fall under the proposed energy union vice-president) requires a strategy – and it should contain the elements below.

Elements of an electrification strategy for transport

An electrification strategy for transport should contain the following elements:

1. **Beyond Transport** to integrate Europe’s energy needs in transport with those in generation and industry. Specifically to ensure e-mobility complements smart, sustainable generation and grids through stimulating off-peak charging of batteries, on-board smart metering, and battery re-use, among other things.
2. **Beyond cars** and stimulate a market for smaller and lighter e-vehicles, from e-bikes to quadricycles like the Twizy. The e-bike market is booming with sales of around 1.5 million in the EU – some 30 times more than electric car sales. More could be achieved through creating a single market and streamlining the type approval framework.

3. **Beyond combustion** by setting CO₂ standards for cars, vans and lorries for 2025 that stimulate a shift to e-mobility with annual targets from 2025 onwards. For cars this necessitates a target for 2025 of around 70g/km measured on the current test. The regulation should also set a flexible mandate for all manufacturers to meet in terms of plug-in vehicle sales. These credits would be tradable, incentivising over-compliance while companies failing to meet the goals would be required to achieve greater improvements in the efficiency of conventional vehicles. This is similar to the California-style Zero Emission Vehicle (ZEV) mandate that combines flexibility with effectiveness.³
4. Electrified transport cannot be limited to cities, it must be extended **beyond urban areas** to decarbonise transport. A key opportunity is electrification of inter-urban rail that was also identified as having a key role to play in delivering the 2011 White Paper modal shift and decarbonisation targets. International *non-High Speed Rail (HSR)* transport is the poor relative to HSR and freight on rail and must be strengthened. Key initiatives should be a new Eurotoll directive to facilitate road pricing, further technical harmonisation in rail, strengthening of independent infrastructure managers to avoid implicit discrimination, and a push for much more advanced planning, booking and ticketing systems across borders and companies.
5. A key element on an electrification strategy must be to go **beyond ownership**. Carsharing has grown twentyfold over the past decade with around 2 million Europeans now enrolled. The economics of electric cars (principally fixed, not variable costs) lend themselves to sharing vehicles. It also addresses the challenge of consumers buying cars that meet their most extreme needs. The Commission should specifically seek to promote both electrification among the 50% of new cars bought by fleets and sharing among private consumers. Enabling users of existing car share schemes to shift seamlessly to others provides as they travel, essentially carshare roaming. It should be actively promoted by the Commission and developed by the industry. Demonstration projects would be especially beneficial in this area.⁴
6. The European Commission has been focused on addressing the chicken and egg challenge of recharging infrastructure but has failed to persuade member states of its solution. It now needs to move **beyond plugs** by setting EU standards that facilitate EU-wide access to recharging points through instigating “roaming” arrangements along with smart charging and billing. It should also support a recharging network along the Ten-T network. A key advantage of liquid fuels is that vehicles can be refuelled anywhere in Europe. This is not the case for electric charging points where a plethora of proprietary systems has emerged. EU actions in these areas would remove cross-border range anxiety and ensure available recharging points were more intensively used.
7. Finally the current strategy must ensure greater value is extracted from Horizon 2020 by moving **beyond demonstration**. R&D spending must be intensified and refocused. In the past too many Commission research activities have been poorly coordinated and lacked value. Demonstration projects have lacked ambition and failed in most cases to integrate e-mobility into multimodal transport solutions. R&D efforts must be focused on the key challenges, ensuring particularly that the EU develops cutting edge, cost-effective battery technology and non-battery ways to deliver electricity to the vehicle.

Conclusion

Electrification of transport offers a unique opportunity for Europe to simultaneously decarbonise transport; end dependence on imported oil; create jobs and growth; and for industrial innovation. To do this Europe should adopt a strategy for cross-modal, cross-vehicle electrification of transport as a key pillar of the energy union. Done in the right ways this will also facilitate the transport White Paper goals of enhancing multimodality and a shift to more sustainable vehicle sharing and lighter and smaller vehicles. Europe must begin to think beyond promoting incremental change to driving a transformation of the vehicle fleet. At the beginning of a new five-year policy cycle, Europe has a unique opportunity it should not waste.

Further information

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¹ <http://www.eutransportghg2050.eu/cms/assets/Uploads/Reports/EU-Transport-GHG-2050-II-Task-1-FINAL-12Jul12.pdf>

² MOVE, ENER, CLIMA, ENTR, REGIO, ENV, RTD, JRC, TAXUD, EIB

³ The most recent 2009 amendment to CARB's ZEV program provides additional credits for ZEVs placed in transportation systems, depending on the amount of shared cars used and the linkage to public transport.

⁴ Germany's transport minister, Alexander Dobrindt, recently cleared this legislative hurdle allowing cities to provide parking space to car-sharing providers.