

FUTURE CLIMATE & ENERGY POLICY

Contribution of The Shift Project

As Europe reaffirms its commitment to fight climate change and continues its transition towards a society powered by low-carbon energy sources, the question of which long-term strategy to embrace naturally arises. The Shift Project, as an independent think-tank dedicated to serve the common good by performing and publishing high-quality research on issues revolving around the energy transition and climate change, has explored a broad range of options which would allow to substantially decrease European greenhouse gas emissions by 2050 and fit in the long-term European strategy for greenhouse gas emissions reduction. Nine key proposals have been identified and put forward in the “Manifesto to decarbonise Europe”, which is summarised in the present document. The problem tackled in each proposal is briefly introduced with a series of facts, and solution avenues are then presented. The envisioned benefits of these solutions are highlighted and quantified in terms of greenhouse gas emissions that may be avoided by 2050. Their projected costs are also estimated for clarity and comparison purposes. The full details of the analyses performed as well as a complete set of references is readily available on the webpage of the Shift Project.

The first proposal looks at electricity production in Europe. The EEA reckoned in 2012 that electricity production in the Union accounted for approximately 25% of its total greenhouse gas emissions. In particular, coal power plants are responsible for approximately 65% of carbon dioxide emissions in the European electricity sector. As a result, phasing out coal and replacing it with carbon-free or low-carbon electricity generation technologies, namely traditional renewable power plants such as solar, wind or hydro, as well as dispatchable plants like nuclear power plants would contribute 750 megatons (Mt), or 24% of carbon dioxide equivalent emissions reductions towards achieving the minimum objective of the Paris Agreement. An obvious side benefit of this measure would be a significant improvement in air quality in regions where coal power is prominent, thereby contributing to reduce the pollution causing the premature death of hundreds of thousands of European citizens each year. Overall, such measures are estimated to cost between 400B€ and 1300B€ between 2015 and 2050, depending on the choice of coal substitutes across countries. The lower bound of the range is representative of a scenario in which coal is replaced by nuclear in all concerned countries, and corresponds to a cost of 533€/t of carbon dioxide emissions avoided.

The second, third and fourth proposals focus on various aspects of transportation and its implications for climate policy. According to the European Environment Agency (EEA), road transportation roughly accounted for a whopping 94% of transportation-based emissions in Europe in 2012. More precisely, private vehicles and small utility vehicles contributed 58% and 8% towards this total, respectively. In light of this, promoting the development and widespread use of highly fuel-efficient private and small utility vehicles appears as a welcome measure to reduce the carbon dioxide emissions in the transportation sector. Policies should be enacted that favour the development and commercialisation of vehicles consuming approximately 2L/100km, as well as systematically penalising the biggest emitters. Such policies would make it possible to reduce the annual carbon dioxide equivalent emissions in the European transport sector by 400 mega tons by 2050, which corresponds to approximately 14% of the total emissions cuts required to meet the carbon budget targets set out in the Paris Accord. The investments needed to implement such measures can range from nothing to 2000B€, depending on the pace of progress made in improving fuel efficiency and the scale of research and development programmes supported by such policies.

Still within the realm of transportation, urban mobility is an area envisioned to hold great potential for greenhouse gas emissions cuts. Indeed, within the European Union, it is estimated that about 40% of transportation-based carbon dioxide equivalent emissions stem from mobility in an urban setting. In particular, private vehicle use represents a substantial proportion of those emissions. In order to tackle this issue, the development of dedicated transport solutions, along with the promotion of bicycle use, the encouragement of carpooling and the establishment of express bus networks in semi-urban areas should be aggressively pursued. Additionally, valuable side benefits of such measures would be a significant improvement in the health and quality of life of city dwellers, notably as a result of reduced pollution and congestion, the latter having a substantial economic cost nearing 1% of the European Union gross domestic product. The implementation of such measures could allow to slash as much as 170 Mt of carbon dioxide emissions, which constitute almost 6% of the total emissions reductions to reach the targets enshrined in the Paris Accord. Overall, the estimated cost of such measures would range between 750B€ and 1050B€, which translate to costs of 4400€ and 6100€ per ton of carbon dioxide emissions avoided.

The fourth proposal considers options to better connect major cities with the help of low-carbon technologies. To be more accurate, in the context of a heavily decarbonised electricity mix, trains running on electricity do not emit a great deal of greenhouse gases. At this point, only 7% of passenger transportation is done by train in Europe, which leaves much room for progress. Hence, improving existing infrastructure, further developing high-speed rail links as the backbone of modern European transportation networks and re-allocating subsidies to promote transportation by train rather than by plane for medium-distance travel would go a long way in realising substantial carbon emissions cuts. To be more accurate, as much as 250 mega tons could be saved by such initiatives by 2050, which amounts to roughly 9% of the total reductions needed to satisfy the minimum requirements in the Paris Accord. The costs of such policies are estimated to lie between 1000B€ and 1700B€, amounting to specific costs ranging from 4000€ to 6800€ per ton of carbon dioxide emissions avoided.

The fifth proposal envisages the development of a novel kind of low-carbon heavy industry. As far as current European industry is concerned, EEA data from 2012 suggests that it was responsible for almost 20% of greenhouse gas emissions in the European Union. The cement (18%), chemistry (18%) and steel (20%) industries account for over 50% of this total. These industries are energy-intensive, and supporting the shift in primary energy sources from fossil fuels to alternative low-carbon fuels would be a first step towards the decarbonisation of the industrial sector. In addition, the carbon intensity of industrial processes can most certainly be improved, for instance through the development and deployment of carbon capture and storage technologies. Finally, the accrued use of recycled materials, putting the emphasis on greater efficiency in materials use, and the broader implementation of circular economy concepts would also contribute to greenhouse gas emissions reductions in the industry sector. In practice, the European Union can lend legislative and regulatory support to such proposals by establishing regulatory frameworks conducive to the emergence of more sustainable industry practices, as well as strengthening the European Union emissions trading system. Government funding for research and development in key industrial processes and technologies such as carbon capture and storage would also greatly help. Overall, the implementation of such measures would need an annual investment of 10B€ (amounting to a cumulated investment nearing 300B€ by 2050), and enable the slashing of around 200Mt of carbon dioxide equivalent emissions by 2050, which constitutes almost 7% of the Paris Agreement targets and implies a cost of 1500€ per ton of greenhouse gas emissions avoided.

The sixth and seventh proposal explore the role buildings of various types can play in climate policy. According to ODYSSEE data, buildings accounted for at least 36% of carbon dioxide emissions across the European Union in 2012. European households contribute 67% to this total, and approximately 80% of the household energy consumption stems from the heating of living areas and hot water. Against this backdrop, it is estimated that increasing energy efficiency and insulation in most residential buildings built prior 1990, as well as shifting to carbon-free or low-carbon heating solutions such as heat pumps could save as much as 500 Mt of carbon dioxide equivalent emissions by 2050, nearly 17% of the total needed towards achieving the Paris Accord objectives. Obvious side benefits would include the creation of widespread and consistent economic activity, as well as opportunities for European businesses and people in the construction industry, energy equipment sector and all related areas. Better insulating homes would also improve the quality of life of their dwellers, and would constitute a major step in tackling energy (and fuel) poverty, which is a source of concern in the European Union, with at least 10% of households facing it (as pointed out by the European Commission). Overall, cost estimates for policies supporting similar measures range from 5000B€ to 8500B€, corresponding to costs per ton of carbon dioxide avoided between 10000€/t and 17000€/t. Savings in energy bills are expected to offset some of those costs to the consumer.

As it turns out, not only residential buildings consume a great deal of energy and emit carbon dioxide. In fact, ODYSSEE data suggests that energy consumption in the tertiary sector has increased by around 50% in the European Union since 1990, leaving much room for energy savings and emissions reductions in non-residential buildings, in particular in the public sector. Increasing the pace of renovation to a rate of 3% of the stock each year could save up as much as 100 Mt by 2050, i.e. almost 4% of the total required by the minimum objectives of the Paris Accord. As for the renovation of residential buildings, such measures would contribute to the creation of jobs in the construction industry, in addition to the professional services industry, for example project management and finance. Overall, such measures are estimated to cost between 1200B€ and 2200B€, resulting in a cost per ton of carbon dioxide emissions saved between 12000€ and 22000€. In practice, the provision of long-term, low-interest funding mechanisms would enable such measures, and lenders would be rewarded with European Union-backed guarantees.

The penultimate proposal studies the potential to trap carbon dioxide by natural means, and by re-considering how to best use lumber in climate-minded fashion. Still in 2012, the EEA reckoned that European forests absorb approximately 10% of the yearly European greenhouse gas emissions. Furthermore, it is worth noticing that the use of wood in construction and other long-term applications can serve as an effective way of storing carbon, in fact extending the carbon sequestration function of forests. As a result, supporting afforestation and dynamic forest management programmes as well as promoting the increased use of timber by approximately 100 Mm³ a year (which is approximately twice as much as its current use) could result in greenhouse gas emissions savings nearing 100 Mt by 2050, which correspond to 3% of the cuts envisaged in the Paris Accord. Overall, the investments needed in the primary and secondary wood processing sectors are estimated to lie between 70B€ and 140B€, which translates into costs per ton of carbon dioxide avoided of 700€ and 1400€, respectively.

The last proposal investigates opportunities to reduce the carbon footprint of the food industry. According to EEA data, the European food industry generates approximately 30% of the greenhouse gas emissions of the Union. More precisely, the agricultural sector, which essentially represents food production and as such is part of the food industry, generates roughly 12% of total European greenhouse gas emissions, whilst the remaining 18% come from the processing, packaging, transport, distribution, consumption and waste of agricultural products. Importantly, about 60% of gross emissions of the agricultural sector come from the livestock sector, and, at the very end of the chain, around 20% of food supplies are wasted. Thus, implementing policies favouring quality over quantity, specifically providing appropriate product labelling and certificates of (protected) origin for animals, adapting the remuneration of livestock farmers accordingly, along with running awareness campaigns about food waste could lead to reductions in greenhouse gas emissions as high as 135 Mt by 2050, amounting to nearly 5% of the Paris targets. Conveniently, no additional investment is required to enact such policies, as the common agricultural policy already has a sufficient budget. Only an appropriate re-allocation of funds would be needed.

In conclusion, the rigorous scientific analyses and resulting policies put forward in the manifesto are envisaged to enable drastic economy-wide improvements in energy use and substantial reductions in carbon dioxide emissions, paving the way to a cleaner and brighter future. The task ahead may seem daunting and costly, but let us not forget that the adequacy of our response to the challenges posed by climate change and the energy transition will be felt throughout the decades to come. It is our duty to take immediate, aggressive and consistent action to safeguard the well-being of future generations of humans in Europe and across the globe.

THE SHIFT PROJECT

The Shift Project est un think tank qui œuvre en faveur d'une économie post-carbone. Association loi 1901 reconnue d'intérêt général et guidée par l'exigence de la rigueur scientifique, notre mission est d'éclairer et influencer le débat sur la transition énergétique en Europe. Nos membres sont de grandes entreprises qui veulent faire de la transition énergétique leur priorité.

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ET SI ON DÉCARBONAIT VRAIMENT L'EUROPE ?

DECARBONIZEUROPE.ORG

DÉCOUVREZ NOS 9 PROPOSITIONS POUR DÉCARBONER L'EUROPE

L'Accord de Paris sur le climat engage l'Europe à réduire autant que possible ses émissions de gaz à effet de serre d'ici 2050

La mise en oeuvre de ces 9 propositions permettraient de réaliser l'essentiel des réductions d'émissions nécessaires pour respecter notre « budget carbone »*

*Chaque pourcentage est une estimation de la part du potentiel de réduction d'émission de chaque mesure afin de respecter notre « budget carbone ».

Ce « budget carbone » désigne le plafond d'émissions de gaz à effet de serre visé en 2050, correspondant à une division par quatre des émissions de 1990 des pays européens. Le potentiel de réduction d'émission de chaque proposition est indiqué toutes choses égales par ailleurs.

2050

- 24 %  Fermer toutes les centrales au charbon
- 17 %  Rénover les logements anciens
- 14 %  Généraliser la voiture à moins de 2L/100km
- 9 %  Relier les grandes métropoles par des trains rapides
- 7 %  Inventer l'industrie lourde post-carbone
- 6 %  Accomplir la révolution du transport en ville
- 5 %  Réussir le passage à l'agriculture durable
- 4 %  Lancer le grand chantier de rénovation des bâtiments publics
- 4 %  Développer la séquestration de carbone par les forêts européennes

9 PROPOSITIONS ÉCONOMIQUEMENT RÉALISTES

Investissement annuel requis par ces mesures



Des investissements finançables à l'échelle européenne



Représentant moins de 3% du PIB annuel de l'Union européenne*
*PIB UE = 15 000 Mds€/an environ

Soit près de **1000€ d'investissements** par habitant chaque année