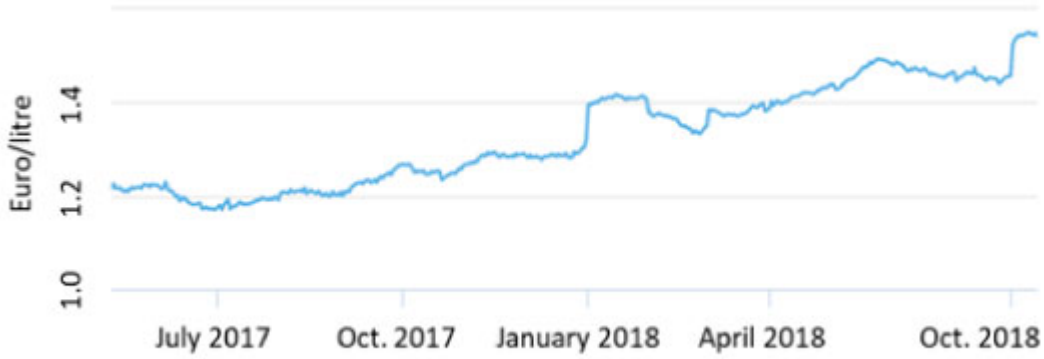
Gilets Jaunes: Is the Energy Transition Possible while still Reducing Inequality?

by Evens Salies

The *gilets jaunes* ("yellow vests")[1] movement offers a striking opportunity to ask whether the Sustainable Development Goals for achieving an energy transition and reducing income inequalities are fundamentally incompatible. Our answer is no! Both objectives must and can be met simultaneously: the political acceptability of environmental policies, such as carbon pricing and subsidies for green technologies, crucially hinges upon their distributional effects. While the concept of the 'just (fair) transition to low-carbon energy' for workers has figured in the climate debate at the annual COP meetings[2], the issue of how to spread the cost burden of this transition among end-consumers remains somewhat out of the frame. Clear guidelines on the design of energy transition policies that have adverse effects on low-income households are still needed in France.[3]

To give some context, the yellow vests movement began in November 2018 in response to a programmed rise in carbon taxes, which coincided with a 25% increase in car fuel prices (see the figure below) and followed previous hikes in oil prices and fuel taxes. The government ended up cancelling this measure in December in response to street pressure.

Figure 1. Average gasoline price (unleaded gasoline 95), May 7th 2017-October 15th 2018



Source: http://www.carbu.com

The higher carbon tax was part of a package previously issued under the Hollande presidency, which consisted of two main measures to reduce greenhouse gas emissions in the automobile sector. The first measure consisted in increasing the taxes on gasoline and diesel fuels by nearly 5 and 8 cents (€) per litre (excl. value-added tax), respectively. That is an approximate increase of between 3% and 5% on the final price paid at the pump, which currently averages €1.40/litre. The so-called TICPE (domestic tax on the consumption of oil products) is the main tax on car fuels. The 2015 Finance Bill split TICPE into two components, an 'energy' component (new TICPE) and a 'carbon tax' component, the future values of which are already planned until 2022 based on a trajectory determined by the Quinet commission.[4] On top of the TICPE, a value-added tax of 20% is applied so that two-thirds of car fuel prices are now made up of taxes.

Second, the policy package envisaged a flat subsidy of up to €2,500 on the purchase of an electric vehicle ("EV") for people who scrap their old car. The French government went in the right direction by reforming this subsidy following protests earlier in December last year; it is now twice as much for the most vulnerable households. From a welfare economics perspective, there are clear reasons to oppose the government's original policy package.

Despite the existence of an ‘energy cheque’ for domestic gas and electricity consumers, and a bonus-malus scheme on the purchase of new cars depending on their CO_2 emission rate, car fuel taxes disproportionately affect the poor. There are also clear differences between small and large cities, as shown by Paul Malliet, who examined the carbon tax equity puzzle using the 2011 Family Expenditure Survey. Taxes on fuels are regressive, as is car fuel pricing. Like other necessity goods, their share in the budget is higher for poorer households. Using the previous version of the Family survey, more precisely that for 2006, we find results that are qualitatively similar to Malliet’s: the income share of car fuel expenditure is 9.2% for households with income in the 0-20% bracket and 3.2% for those in the 80-100% bracket. In the case of diesel fuel, the incidence of a 5% price increase is roughly twice as much for the bottom 20% of households as for the median household; indeed, it amounts to approximately 0.4% of the annual income of the former.

In addition, financial constraints (access to capital and loans) make it more difficult for poorer households to switch to low-emission vehicles, even subsidized ones, if the subsidy is insufficient to help consumers reach a certain threshold. This is reflected in the low estimated short-run value for the percentage decrease in car fuel consumption, -0.2%, in response to a 1% increase in fuel prices.[5] Furthermore, the environment is likely an inferior good for poorer consumers, who must first satisfy basic needs, such as food, housing and health care. The degree to which consumers have patience to wait the implications of a policy effect is correlated with income; thus, policies that have long-term effects receive less support from poorer strata than those that have immediate effects.

However, one could argue that a 0.4% income loss on average hardly justifies such strong opposition, keeping in mind the little-known fact that France’s after-tax redistribution is

one of the highest in the world, and noting that harsh socio-economic conditions already existed upon implementation of the package. These conditions are illustrated by recent research connecting the rise of populism to the several adverse shocks negatively affecting less skilled and less wealthy households alike, notably automation and globalization, while dramatically increasing incomes at the top end of the distribution (Autor et al., 2016; Colantone and Stanig, 2018).[6]

These triggers have been amplified by sociological factors, including the need to belong to a community and be visible and the loss of cultural identity in disadvantaged areas. The distinction between rural (peripheral) and urban living areas, although broad, is interesting here, for the yellow vests movement emerged from within peripheral cities that serve predominantly rural hinterlands. *Métropolisation* has cut French society in two.[7] Places that globalization has transformed into dynamic urban areas and *la France périphérique,* where households live far from public and transportation services, spend more on fuel while earning less. Consequently, the incidence of an increase in energy taxes, *ceteris paribus*, is more effective and harsher for households in these peripheral areas, keeping in mind that car fuel expenditure is 4% higher for the bottom 20% households in rural areas than for urban ones, whereas their monthly income is 3% less.

The question is thus: would it have it been possible to make the package fairer? Our answer is yes, and there are examples to guide a much-needed revision. California implemented a progressive subsidy targeting disadvantaged areas and low- to middle-income households. The large positive impact of such a policy suggests that progressive subsidies can be perceived by individuals as fairer and be more effective than flat ones in terms of creating a mass market for EVs.[8] Indeed, wealthier

households are likely to buy an EV even in the absence of a subsidy or in response to steady increases in gasoline prices.[9]

The benefits of progressive subsidies associated with greener cars can be magnified by targeted industrial policies favouring local producers and thus potentially creating jobs in the EU. Policymakers can also envisage clauses for local input content. Another key element is the timing of the subsidy. To enhance the local benefits, a gradual increase of the subsidy over time would likely allow the European automotive industry to have enough time to make investments to adapt to the new regulation, akin to the euro 6 emission standards policy, which gives an appropriate lead time to the industry for introducing technical developments.

We do not want to exaggerate our claims. There is a major obstacle to EV adoption, namely 'range anxiety', or the idea that consumers are sensitive to the limited range of an EV (e.g., the stressful situation of the battery running low and the need to drive a longer distance than the EV is usually capable of). This problem is well documented in the 2019 paper by Noel, L. *et* al., "Fear and loathing of electric vehicles: The reactionary rhetoric of range anxiety," *Energy Research & Social Science*, Vol. 48, pp. 96-107. Furthermore, EVs are just one part of the solution; investment in public transportation and urban management are equally important ways to tackle the energy transition while still reducing inequality.

To conclude, we argue that the much-needed political debate ignited by the yellow vests could be considered a unique opportunity for the ruling parties in EU countries to combine the various energy 'transitions' with job creation and an increase in perceived or even actual fairness and social security in *la France périphérique*. Imposing a clause of local-content seems a politically feasible option to grasp the full benefits of a big subsidy push for EVs and other

investments in low-carbon transportation infrastructures. The question of how to account for differences between geographical areas when implementing the energy transition is of much importance. France's current Great National Debate on constitutional issues, taxation and the country's transition to a low-carbon economy will perhaps offer a step in addressing those issues as well as the main question of who should be in the front line to pay for this energy transition.

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[1] Symbolically linked to the plight of the motorist and commuter, since it is compulsory to have such a yellow vest in every vehicle.

[2] See Vona, F. (forthcoming), "Job losses and the political acceptability of climate policies: why the job killing argument is so persistent and how to overturn it", *Climate Policy*.

[3] See Mehling, M., 2018. "Emmanuel Macron's carbon tax sparked gilets jaunes protests, but popular climate policy is possible", *The Conversation*, December 10th.

[4] Based on figures made available by the French Ministry of Ecology, the carbon tax on gasoline was supposed to increase by 2.4 cents (€) in 2019, while that on diesel was supposed to increase by 2.7 cents. The higher increase in the tax on diesel reflects the recent government decision to harmonize the overall taxation of diesel fuel and gasoline as an incentive to reduce consumers' purchasing of diesel cars

because of environmental pressure, perhaps also related to the Volkswagen scandal.

[5] Long-run responses are generally of a higher magnitude. See Collet, R., de Lapparent, M., Hivert, L., 2015, "Are French households car-use addicts? A microeconomic perspective," in the *Journal of Behavioral and Experimental Economics*, Vol. 54, pp. 86-94, for a recent study on car fuel elasticities.

[6] Autor, D., Dorn, D., Hanson, G., Majlesi, K., 2016. "Importing political polarization? The electoral consequences of rising trade exposure." *NBER Working Paper* No. 22637, September; and, Colantone, I., Stanig, P., 2017. "The trade origins of economic nationalism: Import competition and voting behavior in Western Europe." *American Journal of Political Science*, Vol. 62, pp. 936-953.

[7] See Caldwell, C., 2017. "The French fracture." *New Statesman*, pp. 30-35. Some writers suggest a further triggering event, in 2013 when *Bonnets rouges* ("red caps") protesters forced François Hollande's government to back away from levying a 'carbon tax' on heavy trucks, revealing French drivers' resistance to environmentally-related taxes

[8] Muehlegger, E., Rapson, D., 2018. "Subsidizing mass adoption of electric vehicles: quasi-experimental evidence from California." *NBER Working Paper* No. 25359, December.

[9] An even more ambitious plan would be to make progressive subsides to EVs a pan-European flagship policy to fight climate change, by financing it with a very small EU tax on wealth whose budget will be entirely devoted to greening the automotive industry.

Promoting the Energy Transition Through Innovation

by Lionel Nesta, Elena Verdolini, and Francesco Vona

With the striking exception of the USA, countries around the world are committed to the implementation of stringent targets on anthropogenic carbon emissions, as agreed in the Paris Climate Agreement. Indeed, for better or for worse, the transition towards decarbonisation is a collective endeavour, with the main challenge being a technological one. The path from a fossil-based to a sustainable and low-carbon economy needs to be paved through the development and deployment of low-carbon energy technologies which will allow to sustain economic growth while cutting carbon emissions.

Unfortunately, not all countries have access to the technologies which are necessary for this challenging transition. This in turn casts serious doubts on the possibility to achieve deep decarbonisation. Developed countries accumulated significant know-how in green technologies in the last decades, but most of developing and emerging countries do not have strong competences in this specific field. Yet, it is in these latter countries that energy demand, and hence carbon emissions, will increase dramatically in the years to come. The issue at stake is how to reconcile the need for a global commitment to the energy transition with the reality of largely unequal country-level technological competences.

Public R&D investments play an important role in the diffusion and deployment of low-carbon technologies. Public investment in research is the oldest way by which countries have

supported renewable energy technologies. For instance, following the two oil crises of the 1970s, the United States invested a significant amount of public resources in research and development on wind and solar technologies, with a subsequent increase of innovation activities in these fields. The same pattern can be observed in the last two decades in Europe, where solar, wind and other low carbon technologies have been supported by public money. But innovation policies and R&D investments are only one of the possible ways in which governments can stimulate low-carbon innovation.

Environmental policies are another way to stimulate clean innovation, which comes as an additional pay-off of emissions reduction. Usually, governments rely on two different types of environmental policy instruments: command-and-control policies, such as emission or efficiency standards, and market-based policies, such as carbon taxies or pollution permits. The former put a limit on the quantity of pollutant that firms and consumers can emit. The latter essentially work by putting an explicit price on pollution. Both types of instruments have the direct effect of lowering carbon emission in the short term. In the longer term, they also have the indirect effect of promoting low-carbon innovation. This is because they make it worth for firms to bring to the market new, improved technologies. Over the past decades, countries have implemented different low-carbon policy portfolios, namely a combination of different policy instruments to foster the development and deployment of low-carbon technologies. The combination of R&D, command-and-control and market-based policies varies greatly across countries.

A crucial question often debated in the literature is : which policy instrument is more effective in promoting innovation in renewable technologies vis-à-vis innovation in efficient fossil-based technologies ? Importantly, low-carbon innovation can refer either to renewable technologies, which effectively eliminate carbon emissions from production processes, or to

more efficient fossil-based technologies, which decrease the content of carbon per unit of production. Favouring the former type of innovation over the latter is strategically important in the long-run: renewable technologies allow to completely decouple economic growth from carbon emissions. Conversely, fossil-based technologies may give rise to rebound effects, namely increase in overall energy demand (and possibly also in overall emissions) because they make it cheaper to use fossil inputs.

A recent study by Nesta *et al.* (2018) shows that certain combinations of research and environmental policy instruments are more effective in promoting renewable energy innovation than others. More specifically, there is no 'one-fits-all' solution when it comes to choosing the optimal combination of market-based or command-and-control environmental policies. *Au contraire*, to be effective in promoting renewable innovation, policy portfolios need to be tailored to the specific capability of each country. The study relies on data on innovation in low-carbon and fossil-based technologies in OECD countries and large emerging economies (Brazil, Russia, India, China, South Africa and Indonesia, BRIICS) over the years 1990-2015. The authors apply an empirical methodology that allows to test how effective each "policy mix" is in promoting innovation, depending on the level of specialization of each country in terms of green innovation.

The analysis shows that there are three different regimes of low-carbon specialization. The first one characterizes those countries with extremely low competences in green technologies as compared to fossil-based technologies. This accounts for about half of the observations in the study, including the BRICS countries. In this case, the research suggests, the only effective way to promote the redirection of technological expertise towards green technologies is through direct investment in low carbon R&D.

The second regime does come into play until a country shows

enough specialization in green technologies. In this regime, environmental policies start to become effective in further consolidating the green technological specialization. The successful innovation strategy in this case is that which combines command-and-control policy instruments – which lower the incentives associated with fossil innovation – with market-based policies – which increase the incentives associated with green innovation.

The third regime is characterized by a substantial specialization in green know-how. This regime includes only 12 percent of the observations in the study. In this last case, market-based instruments alone are effective in sustaining green innovation vis-à-vis innovation in fossil technologies.

Countries which tailor their policy portfolio based on their level of competencies will be more successful in promoting renewable innovation. A clear example of the dynamics behind this finding is illustrated by Denmark. In the pre-Kyoto period, Denmark had not yet reached the required level of expertise in renewable energy. The country continued to invested heavily in building such expertise through significant investments in renewable research and innovation. As a result, Denmark moved to the second regime. At that point, the country strengthened both command and control and market-based policy instruments, further promoting renewable innovation vis-à-vis innovation in fossil-based technologies. This resulted in an even higher level of competencies in renewables, bringing Denmark to the third regime. The country was then in a position to switch away from command-and-control instruments and simply rely on market-based instruments to promote renewable innovation.

Countries which fail to tailor their policy portfolio are not successful in promoting renewable energy innovation. For instance, France represents a case of failure, as illustrated by our results. The lack of an adequate market-based support for renewables in the nineties led to the full dissipation of

the French early advantage in these technologies. Indeed, France was the only country that is in the third regime in the first period and was then in an ideal position to implement ambitious policies before other countries, thus keeping its relative technological advantage. Instead, the country chose to fully specialize in nuclear energy. This eroded France's capability in renewable energy innovation. This implies that France cannot simply rely on market-based instruments to successfully promote renewable innovation nowadays.

These results are of interest for emerging economies, and suggest that countries like Brazil, Russia, India, Indonesia, China and South Africa should be less timid in strengthening the stringency of both types of policy instruments, because they are well positioned to fully benefit from the innovation incentives. Fast-developing countries desperately need to build innovative capacity in renewable energy technologies and promote their diffusion. Apart from India and, to a lesser extent, Indonesia, all countries have built a satisfactory level of expertise in renewables. This calls for the implementation of both market-based and command-and-control policy instruments as means to embark on a virtuous renewable innovation circle. China stands out due to a high level of expertise in green technologies. Overall, their level of expertise in renewables is such that they would be in the position to fully benefit from the innovation incentives associated with more stringent mitigation policies in support of the energy transition.