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#TRADE
#ENVIRONMENT

GREENING
THE EUROPEAN UNION'S TRADE POLICY
THE ECONOMICS OF TRADE AND THE ENVIRONMENT

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This note is the second in a series of publications that the Jacques Delors Institute has undertaken **with the support of the European Climate Foundation** in order to explore the inevitable changes in EU trade policy following the European elections last May. Inevitably, trade policy in the upcoming years and beyond will have to find its place in Europe's new "green deal", which was recently announced by Ursula von der Leyen, President of the new European Commission.

The results of the special Eurobarometer survey on Europeans' attitudes on trade and EU trade policy published in November (2019) also confirm the relevance of this research nexus. In the study, citizens attribute the protection of European environmental and health standards as the second highest priority in trade policy[1].

The first note[2] was intended to lay out a general overview of the problems to be solved and the possible solutions available. In comparison, this note seeks to better describe the theses put forward by various schools of economics on the effects, more or less positive or negative, of the opening up of trade on the environment, mainly from a climate mitigation point of view.

It concludes that international trade, whose impact is still being debated, is not likely the essential variable for the necessary decarbonisation of the European economy, even if trade policy must make a contribution to this major undertaking.

The preservation of our natural resources, as well as the fight against inequalities will require a real paradigm shift and far-reaching reforms aimed at our modes of production and consumption. Trade must accompany, facilitate and accelerate this change. Other upcoming publications in this series will address the ways and means of this necessary trade policy contribution: ambitious standards and their application to imported products and/or carbon adjustments at the border, reforms of the WTO's multilateral framework, new-generation bilateral trade treaties, etc.

1. Special Eurobarometer 491, *Europeans' attitudes on Trade and EU trade policy*, European Union, (November 2019)
2. Lamy, Pons, Leturcq, *Time to green EU trade policy: but how?*, Jacques Delors Institute (July 2019).

1 . THE ADVERSE EFFECTS OF TRADE OPENNESS ON CLIMATE AND THE ENVIRONMENT

Through a scale effect, trade facilitation leads directly to an increase in overall production and volume of traded goods, and consequently to an increase in energy consumption and greenhouse gas emissions. This is how the negative effects of increased trade on the environment appear.

1.1. The scale effect and recent evolutions in world trade: what are the risk factors?

1.1.1. Transportation

Because the total CO2 emissions generated by freight transport could be multiplied by a factor of 3.9 in the next thirty years (from 2108 Mt in 2010 to 8132 Mt in 2050 in a "business as usual" scenario) [3], transportation is therefore a major concern regarding the effects of trade on the environment and climate. The sector's dependence on oil as its main source of energy necessitates particular attention[4].

Freight transport accounts for approximately 7% of global CO2 emissions, a relatively low figure compared to emissions coming from other sectors[5], but sharply growing.

50% of freight transport emissions come from maritime transport, 40% from road transport, 6% from air transport and 2% from rail transport. In terms of volume, 87% of traded products are transported by sea, only 8% by road, 5% by rail and 0.1% by air.

Maritime transport, which accounts for a large majority of the volume of goods transported, contributes less CO2 emissions than other modes of transportation and is already engaged in a low-carbon transition process, the International Maritime Organization adopting a set of measures and requirements (2018) aimed at halving the emissions of maritime transport by 2050.

To date however, regulatory measures in this area remain insufficient regarding emissions from both land and air transport. The increase in trade flows by road could lead to the transport of goods becoming a major threat to the climate. Despite the various compensation methods put in place thus far, the European Union's failure to tax emissions from air transport is an example of these shortcomings, which, if not addressed soon, could constitute a significant obstacle to achieving the objectives of the Paris Agreement. From 3% to 4% per year, the share of air transport in global CO2 emissions could rise to nearly 22% by 2050. The World Tourism Organization forecasts an increase of nearly 400 million in the number of

3. ITF, The Carbon Footprint of Global Trade (2016)
4. WTO, Word Trade Report (2013)
5. ITF, The Carbon Footprint of Global Trade (2016)

international tourists by 2030. Given that half of the 1.4 billion tourists who crossed borders had done so by air in 2018, the consequences of inaction could be quite disastrous[6].

1.1.2. Increase in trade flows and value chains fragmentation

The significant increase in emissions caused by trade flows is first and foremost a mechanical consequence of the increase of goods and services exports, which in volume are 35 times greater than in 1950[7].

The level of production fragmentation in value chains around the world is a second element to take into consideration. Today, there is far more trade in intermediate goods than ever before, and the growth in traded intermediate goods far exceeds the growth in traded final goods. In 1993, world exports of finished and intermediate products were equivalent in value, each representing between 7% and 8% of global GDP. As a result of China's industrial development strategy, the first step of which was to make the country the "workshop of the world", global exports of intermediate goods grew much faster than those of final goods. By 2012, intermediate goods exports accounted for 15% of global GDP compared to 11% for exports of final goods.

This phenomenon of global value chain fragmentation is becoming more pronounced. Not only is the scale of trade increasing from the regional to the global level, but world trade itself is becoming more complex and fragmented. The lengthening of production chains leads to additional transport costs, and also makes the traceability of products' environmental impact much more complicated[8].

1.1.3. Robust growth in the production of highly carbon-intensive goods and mismanaged waste volumes

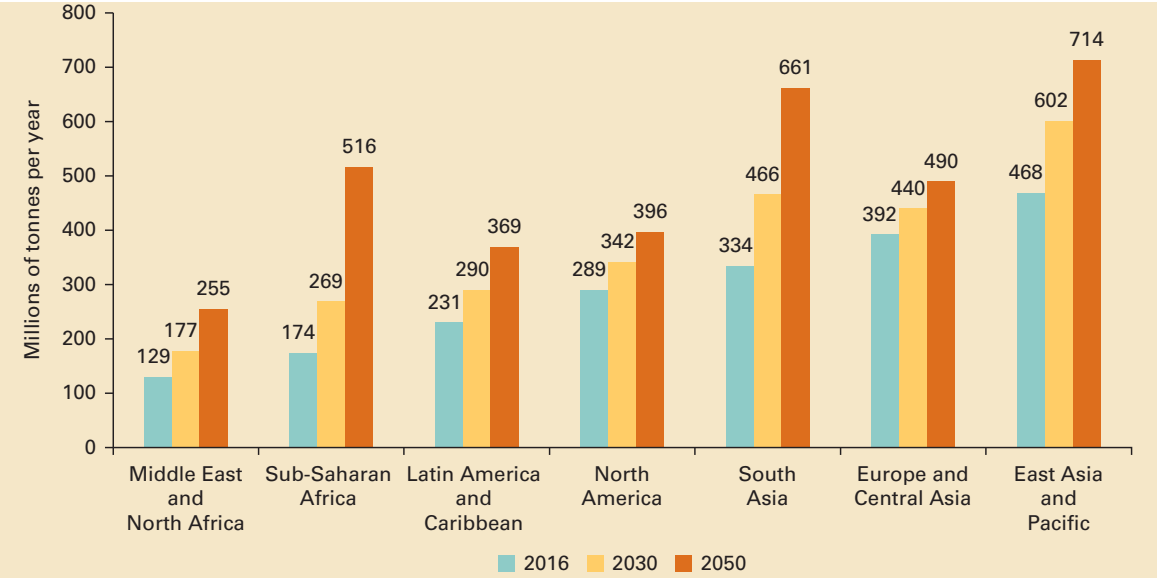
Other factors that tends to accelerate the scale effect are the rapid and above-average growth in the production of highly polluting and greenhouse gas emitting goods (steel, cement, aluminum and livestock) and the lack of international dialogue and cooperation on waste management, disposal and circulation.

- Production of steel and cement generally grows during the very early stages of a country's economic development, insofar as it supports construction activities (housing and infrastructure). While world steel exports have declined in recent years, the annual growth of world steel production is nevertheless stable, being around 4.6% in 2018. World steel production is expected to increase by approximately 20% by 2040, reaching 2 billion tonnes produced each year[9]. This is cause for concern given that iron and steel industries accounted for nearly 50% of industrial coal requirements in 2014[10].
- More than 4 billion tonnes of cement are produced each year, accounting for nearly 8% of global CO2 emissions as a result of chemical and thermal combustion processes during production. Cement plays an essential role in the expansion of the construction sector, particularly in emerging economies. In a "business as usual" trajectory, cement production could reach 5 billion tonnes per year in 30 years.

6. UNWTO, Press release PR 14076 (2014)
7. WTO, World Trade Report (2013)
8. Wiedmann (2016)
9. OECD, Steel Market Developments, Q4 (2018),
10. IEA (2016)

- Although extremely energy-intensive, aluminum production has increased more rapidly than that of other metals as a result of China's construction sector boom starting in 2010 (48% of the world's aluminum was consumed in China during the period of 2010-2018). Aluminum production currently accounts for approximately 1.5% of global emissions and is expected to see a steady and sustained growth until 2030. To keep the sector on a path compatible with the objectives of the Paris Agreement, the International Energy Agency stresses the need to contain production growth to low levels by encouraging recycling and reuse techniques, as well as to work towards reducing the energy intensity of aluminum production by at least 1.2% per year[11].
- Livestock production is equally included among the most polluting productions. As well as being highly energy, water and resource-intensive, production is growing strong and steady at around 4% per year[12]. In 2010, nearly 300 million tonnes of meat were produced worldwide. While most of this production is located in the Americas (North and South), it mainly serves increasing demand from other regions of the world – notably from Asia whose livestock sector is still in its early stages. It should be noted, however, that the meat industry is in the process of being converted.
- Finally, the rapid proliferation of waste throughout the world is a phenomenon that causes serious environmental problems, including but not limited to ocean protection. According to World Bank estimates, the global volume of waste in 2016 amounted to approximately 2.01 billion tons and could reach nearly 3.4 billion tons in 2050 (an increase of 70%)[13]. While plastics are only one of many facets of the waste management issue, they require special attention due to their extremely low recycling rate (9% compared to 80% for ferrous metals, 60% for paper and 50% for glass) and the fact that almost 80% of plastic waste is thrown into the ocean. Beyond, China's import restrictions on plastic waste in 2018, quickly followed by India, Thailand and Vietnam, have made neighboring countries, such as Malaysia, the world's largest importers of plastic. As a side effect, this development resulted in increased volumes of illegal plastic waste imports to developing countries with chaotic and/or non-existent waste management strategies.

FIGURE 1 ▪ Projected Waste Generation by Region (million of tonnes per year)



*Source : **World Bank** (2016), Global Snapshot of Solid Waste Management to 2050*

11. IEA (May 2019)
12. FAO (2012)
13. World Bank (2016)

1.2. Environmental dumping and the pollution displacement effect

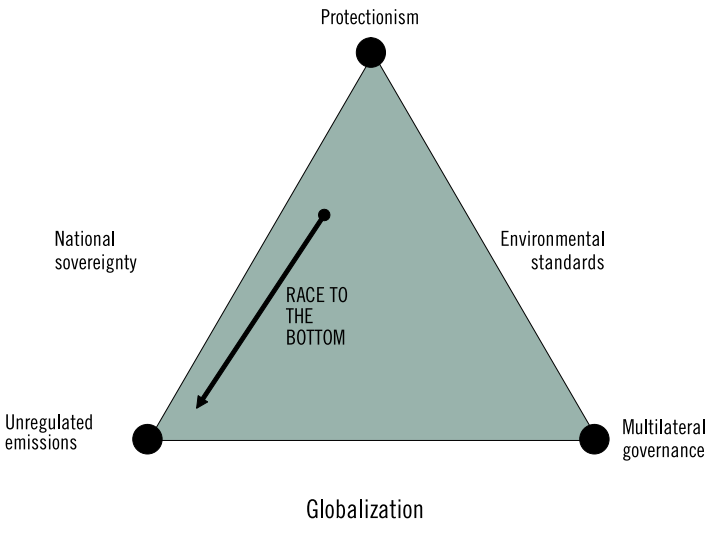
The concept of pollution displacement refers to the more technical term "carbon leakage". The term "carbon leakage" describes the increase in one country's CO2 emissions caused by another country's emissions reduction policy, representing the principle of environmental dumping and relocation of emissions to the poorest regions of the world. This effect is particularly relevant for energy-intensive industries, which are more vulnerable to the stringency of environmental standards and carbon pricing[14].

These effects must be nuanced concerning the least energy-intensive companies, for which environmental standards are not the main reason for relocation. Empirical studies show that the difference in environmental standards is not enough to provide a sufficient economic advantage for these players to decide to relocate. It is a set of factors that must be taken into account, ranging from the availability and cost of labour, the stability of institutions and the market, the proximity of certain resources[15] and the quality of public infrastructure and services.

Emissions from foreign production of imported goods must also be taken into account. In the case of European countries, emissions stemming from imports account for more than 30% of domestic emissions[16]. Though countries such as China and India are regularly blamed for their high level of domestic CO2 emissions, ***per capita*** CO2 emissions in Europe are actually higher than in China once export emissions are deducted and attributed to the country of final consumption.

1.3. The standard approach: "pollution havens hypothesis" and "race to the bottom"

FIGURE 2 ▪ The Impossible Trinity of Global Environmental Regulation



Source : Jeffrey Frankel, Environmental effects of International Trade, Expert report no 31 to the Sweden's Globalization Council, Harvard Kennedy School, 2009, p.38

In a series of articles published in 1975 and 1976 on the theory of environmental policies, Baumol and Oates were the first to model the effect of pollution displacement to the poorest of countries as a result of tightened environmental standards in the richest. The opening up of trade between regions with diverging environmental standards would allow for pollutive industries to escape ecological constraints and move their production to more lenient regions.

14. On this point, see empirical studies led by Garsous, G. & T. Kozluk (2017) : « Foreign Direct Investment and The Pollution Haven Hypothesis : Evidence from Listed Firms », *Documents de travail du Département des Affaires économiques de l'OCDE*, n° 1379, Éditions OCDE, Paris, https://doi.org/10.1787/1e8c0031-en.
15. Copeland, World Bank (2012)
16. Carbon Brief (2017)

Considering appropriate environmental regulation in a globalized economy where sovereign national actors come into play can be a nightmare. For the "environmentalist" trend, this exercise simply leads to a dead end, which they have coined "The trilemma of global environmental regulation", presented here by Jeffrey Frankel. The conjunction of the globalization of the economy and the persistence of national sovereignty in environmental governance would be the driving force behind a "race to the bottom" effect. Following this argument, opening economies to foreign competition would lead states to curb their ambitions in environmental legislation for fear of a loss of competitiveness.

Here again, the conclusions are to be relativized. Several empirical studies on this subject have shown that, on the contrary, the opening of trade can lead to a strengthening of environmental legislation, provided that political institutions are stable[17].

The articulation of different effects is not always obvious, and the displacement of pollution does not necessarily follow a North-South trajectory as the hypothesis of pollution havens asserts. In 1993, Grossman and Krueger demonstrated that, through a compositional effect, NAFTA would on the one hand lead to a reduction in pollution levels in Mexico, which has a comparative advantage in agriculture and labor-intensive industry, while on the other hand lead to an increase in that of the United States and Canada.

Finally, "The California effect" illustrates the opposite argument: that of a phenomenon of progress through exemplarity, i.e. the dissemination of stricter environmental standards following the state's unilateral adoption of these standards by a powerful central actor. When the largest or most powerful state (i.e. California in the United States) sets high environmental standards for itself, it becomes likely that its neighbors and direct trading partners will do the same. In Europe the adoption of EU ETS by Switzerland for instance, illustrates this phenomenon.

1.4. The puzzle of relative prices and the burden of unforeseen externalities

Notwithstanding the positive effects of overcoming certain geographical constraints, the environmentalist trend, led in particular by Herman Daly[18], has criticized the principle of price-based free trade since the 1990s. First of all, Daly contests the relevance of the composition effect.

He presents the economy as a subsystem that should function not independent of any environmental and social considerations as is currently the case, but should rather be subject to the fundamental rules of the regenerative lifecycle, and the limits of what earth is capable of supporting. Without appropriate regulation, markets alone would not be able to offer a fair price for traded products. Growth based on open trade would therefore be undesirable insofar as environmental costs outweigh the profits. By encouraging trade in goods between countries that do not internalize environmental costs, the opening of trade would lead to inefficient allocation of resources and inevitable environmental degradation.

17. Eiras & Schaeffer (2001) ; Frederiksson & Mani (2004).
18. Herman Daly, *From Adjustment to Sustainable Development: The Obstacle of Free Trade* (1992)

More recently on the issue of environmental externalities, Zumwinkel, Enkvist and Stuchtey[19] shed some light on the matter by describing them as "dark matter of growth". Long considered a marginal phenomenon at the macro-level, externalities are the consequences produced by economic activities on third parties not involved in this activity. In their book "A Good Disruption", the three authors estimate that externalities often go undetected and could have greater-than-expected effects on the economy. At present, "externalities have become the norm, not the exception". The results of the Trucost study to which the book refers are edifying: the total cost of environmental externalities in 2009 would represent nearly 7300 billion dollars, or 13% of global GDP. The study also points out that for some sectors such as cement, steel, aluminum, paper, synthetic pesticides, and cattle farming, the environmental cost (natural capital) would be higher than the total earnings they generate.

2 . OPEN TRADE AND ENVIRONMENTAL PROTECTION: A "WIN-WIN" MODEL?

Since the mid-1970's, several theoretical models have been developed that attribute positive environmental effects to the opening of trade, mainly due to the effects of enrichment and specialization.

2.1. Composition and technical effects: trade as a vehicle for "intelligent specialization"

The World Trade Organization defines the composition effect as the means by which the opening of trade transforms the content of a country's production by directing it towards products in which it has a comparative advantage. The composition effect thus renders trade a lever for efficiency, with geographical specialization generating significant social, economic and environmental gains.

This effect focuses on how surpassing local constraints made possible through specialization leads to better allocation of natural resources and a reduction in production-related greenhouse gas emissions. Specialisation and composition would lead to a decline in greenhouse gas emissions provided that the expanding sectors are less energy-intensive than the regressing sectors. The opening up of trade allows for the free circulation of green technologies: more energy-efficient Japanese car models are entering the American market and replacing energy-intensive "made in the USA" pick-up trucks, wind turbines are being exported from Germany to the Maghreb, and so on[20].

By the very admission of these theorists of the trade/environment relationship, positive effects only occur if the price of CO2 is set at a level such that a sufficient movement in relative prices leads to adequate relocation-specialization.

19. Stutchey, M., Enkvist P.A., Zumwinkel K., (McKinsey) *A Good Disruption, Redefining growth in the XXIst century*, Bloomsbury (2016)
20. Tilman Santarius, Climate and Trade: Why climate change calls for fundamental reforms in world trade policies, (2009)

Among the positive effects suggested by Grossman and Krueger, the technical effect is perhaps the most symbolic, and the one on which empirical studies present the most conclusive results. First, it is based on the idea that the opening of markets encourages innovation, notably towards green technologies. An increase in the number of potential competitors therefore has a stimulating and accelerating effect on the dynamics of research and innovation in all sectors targeted by this competition. The technical effect has also been confirmed by several empirical studies conducted between 2000 and 2012[21].

2.2. The Porter Hypothesis

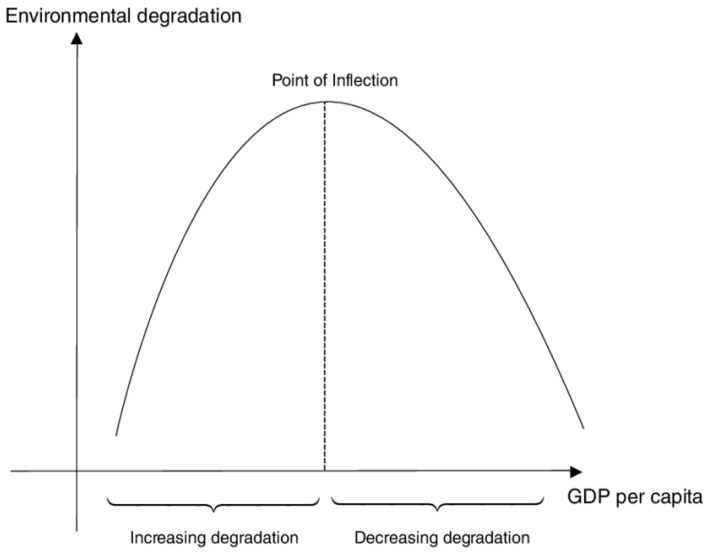
The Porter hypothesis, presented by economist Michael Porter in 1991, contradicts the arguments of traditional theories which claim that raising environmental standards by producing additional costs for companies leads to higher production costs and, consequently, negative effects on their competitiveness in the global market.

Rather, the Porter Hypothesis is based on the idea that the implementation of more stringent environmental policies has a stimulating effect on investment and innovation. The strengthening of environmental protection constraints by public authorities would not only have beneficial consequences in terms of combating pollution and carbon emissions but would also lead to productivity gains insofar as the cost of adapting production methods would be lower than the long-term gains achieved by companies. Porter suggests various mechanisms such as reducing the use of expensive chemicals or curbing waste disposal costs through which environmental regulation could improve competitiveness.

Although it has not always found empirical confirmation, the hypothesis argues in favor of going beyond the short-term logic of assessing the cost-benefit of environmental policies and underlines the importance of a case-by-case evaluation of the cross effects of opening markets to competition and strengthening domestic, environmental and climate regulation.

2.3. The Kuznets environmental curve and development-related effects

FIGURE 3 ▪ The Kuznets environmental curve



Institutional context for sustainable development - Scientific Figure on ResearchGate. Available from: https://www.researchgate.net/figure/The-environmental-Kuznets-curve_fig1_237141307 [accessed 3 Dec, 2019]

The various studies carried out by international organizations responsible for assessing the trends and impacts of world trade on industrial development attest to the leverage effect of trade on growth and coinciding per capita income.

This effect is in line with the Kuznets environmental curve hypothesis.

In the early 1990s, the "Environmental Kuznets Curve" model was proposed and

21. Keller (2004) ; Comin and Hobjin, (2004) ; Copeland, (2012) ; Lovely and Popp (2011)

popularized via successive publications (World Bank; Grossman & Krueger; Shafik & Bandyopadhyay)[22]. Similar to the well-known Kuznets curve[23], the EKC takes the shape of an inverted "U". It evolves to reach a benchmark where the x-axis corresponds to the level of per capita income, and the y-axis indicates the level of damage caused to the environment. The rationale behind these 1990s theories is that the environmental impact of economic activity decreases not at a certain development threshold, but from the moment consumers reach an income level sufficient to demand cleaner infrastructure and technologies, as well as have the resources to build them.

Moreover, least developed countries benefit from the absence of a "locked-in" effect[24]. Not having based their industrial development model on pre-existing technologies, the detachment of which can sometimes be complex, the transition of their industries to green technologies can be done in both a quicker and cheaper way.

This school of thought also focused on the effects of trade reduction, which would come as a result of various measures designed to reduce its flows made in the name of equating environmental protection with economic protectionism.

The models used demonstrate that measures aimed at preventing international trade relations does not lead to better protection of the environment through casual effect. Measures to slow trade have minimal and therefore insufficient consequences on the dynamics of climate change. In a note published in 2017, Lionel Fontagné, Dominique Bureau and Katherine Schubert present the following simulation: by increasing average customs duties to 17% compared to the current 5% (excluding agricultural products), global emissions would only be reduced by 3.5% by 2030, which is very far from the goal that the EU should soon set itself of a reduction of at least 50% by that date and would also be at the cost of a 1.8% drop in world production[25].

2.4. Long vs. short supply chains: How to evaluate arguments in favor of local production and consumption

The increased popularity of purchasing goods directly from the primary producer, the French Associations for the Preservation of Smallholdings (AMAP) and urban local farmers markets reflect a growing movement towards localism, which can be seen in select European countries. Guided by assumed economic, social and environmental benefits, Europeans keen to reduce the distance between the products they consume, and their origin turn increasingly towards direct supply or shorter supply chains with only one intermediate between producer and consumer.

The scarcity of studies investigating short supply chains underlines the vast diversity of cases united behind the phenomenon. Notwithstanding their unquestionable economic and social advantages (higher margins, improved recognition of the producer's work, links with the local community, consumer's capacity to control the production directly), buying local is not an environmental panacea.

22. Grossman & Kueger (1991) ; Shafik & Bandyopadhyay (1992) ; IBRD (1992) ; Panayotou (1993)
23. Kuznets (1955)
24. Copeland, World Bank, 2012
25. Fontagné, Commerce et Climat : pour une réconciliation, 2017.

In contrast, the French Environment and Energy Management Agency (Ademe) underlines the risk of potential adverse effects on the climate, the environment and the biodiversity when localism is pursued blindly. For example, lettuce grown in Germany in winter produces two times the CO2 emissions of imported lettuce from Spain, grown in the same time frame[26].

Furthermore, short-distance transport produces relatively more GHG emissions than optimised global transportation routes. On a transatlantic scale, maritime shipping releases 100 times less CO2 emissions per kilometer than using 3,5-ton-trucks. Without minimizing the positive impacts of shorter and more local supply chains for the development towards more sustainable food (greater respect of seasons, selling of misshapen products), it is noteworthy that issues related to logistics, conservation, and adaptation to changing demands seriously challenge the current benefits of buying local[27].

Therefore, beyond reducing the distance between places of production and consumption, increasing consumer awareness targeting plastic packaging, addressing the nature of the production process, as well as employing recycling chains represent additional fundamental elements of the circular economy transition.

3 . A NECESSARY PARADIGM SHIFT FOR GROWTH RATHER THAN TRADE?

3.1. While the sum of the effects described above does not allow for a decision (from the economic point of view) to be made on the question of the positive or negative effects of the opening up of trade on climate change given a) the sheer number of parameters to be considered, b) the situations of different countries or sectors, and c) uncertain measures, they nevertheless make it possible to make three observations:

- Since 1950, trade has accounted for an essential and growing share of global wealth. It is at the base of geographical specialization and the inextricable web of interdependent relationships at the global level.
- It has of course played a role as a growth accelerator and has been accompanied by the development of CO2-emitting transport, but it has also been the preferred vehicle for practices and standards that can have had beneficial effects on the environment
- Trade measures must accompany and promote the profound transformations in our production and consumption patterns that will be at the heart of the energy and ecological transition.

3.2. The cost of pollution worldwide is estimated to be around 4600 billion dollars, or Japan's GDP (6% of global GDP)[28]. The world economy consumes 90 billion tons of natural resources each year (three times more than in 1970) and its population is expected to increase from the current 7.6 billion to nearly 10 billion by 2050. At the same time, per capita income is set to triple[29].

26. ADEME, Alimentation – Les circuits-courts de proximité, Avis de l'ADEME (juin 2017)
27. *Ibid.*
28. Lancet Commission on Pollution and Health (2017)
29. WTO-UNEP (2017)

It is the field of economic and demographic growth, i.e. well beyond trade, that will see the main components played out. In the long term, the key path to sustainable, environmentally friendly development is to integrate environmental externalities into relative prices (not only the price of carbon but of scarce resources as well). The systemic change called for during the various intergovernmental conferences on climate, biodiversity and the oceans will come from a profound overhaul of our growth model, which will reconcile the economic, social and environmental dimensions of development and radically reduce both social inequalities and the deterioration of our natural resources.

The philosophy of sustainable development, the energy transition, and the implementation of a circular economy will inspire this change, which is more clearly defined at the European level than anywhere else in the world.

1. 14% of our energy already comes from renewable sources, but this change needs to be fast-tracked if we want to achieve carbon neutrality by 2050. Transport will also have to undergo major changes via the implementation of mobility policies that integrate urban housing design and changes in working methods. The renovation rate of buildings will have to double, and the financing methods implemented will have to allow for the fight against energy poverty. Agriculture will have to undergo a profound transformation in favor of methods more respectful of soil and human health. Our diet will have to evolve to include a drop in meat consumption – a significant consumer of water and emitter of greenhouse gases – in favor of more cereals.

2. Production methods will have to become more resource-efficient and adopt a new circular economy approach based on the use of secondary materials and the production of 100% recyclable goods. We must move from an extractive economy to a regenerative economy. For example, smart phones should be designed to facilitate the recovery and reuse of rare-earth elements. Such an economy, which is certainly more respectful of natural resources, will at the same time yield further added value. The same amount of rare-earth elements will give rise to multiple smartphones. The products exchanged will involve more innovation and create supplementary added value[30].

3. To achieve such a transformation, finance will play a leading role. This not only includes public finance, which will provide the framework and signal, but above all, depends on private finance, which will deliver most of the 1115 billion euros per year necessary to realize Europe's energy and ecological transition[31]. In order to encourage it, a clear and precise taxonomy of green assets will have to be adopted, and the transparency of portfolios organized. To finance major technological innovations, public-private partnerships will be necessary. Additionally, to encourage the financing of home renovation, regulatory measures will have to be taken to clarify tenant-owner relationships[32].

30. Stutchey, M., Enkvist P.A., Zumwinkel K., (McKinsey) *A Good Disruption, Redefining growth in the XXIst century*, Bloomsbury, (2016)
31. Pons, J-F., *La finance verte : une croissance à accélérer*, Institut Jacques Delors (mars 2018)
32. Pellerin-Carlin, T., Magdalinski, E., Vinois, J-A., *Le green deal pour l'Europe commence par la transition énergétique !*, Institut Jacques Delors (2019)
Pellerin-Carlin, T., *Une transition énergétique juste : l'épreuve de la réalité dans les régions charbonnières de l'Europe*, Institut Jacques Delors (mai 2019) ;
Pellerin-Carlin, T., Fernandes, S., Rubio, E., *Faire de la transition énergétique une réussite européenne*, Institut Jacques Delors (2017)

4. These changes will have positive economic effects. A more sustainable use of materials and energy could add nearly $2 trillion to the global economy by 2050[33]. According to an OECD study, net output in the G20 countries could increase by 2.8% by 2050 through a combination of policies to combat climate change, encourage green investment, and improve climate resilience of infrastructure. The study also highlights the need to open up trade in environmental goods and services. If we add the economic benefit of avoiding natural disasters (floods, storms), the study suggests a potential GDP net increase of 5% in G20 countries by 2050[34].

3.3. What role will world trade play in this change?

Trade will have to accompany and facilitate this change, as well as profoundly transform itself.

5. For trade to facilitate and accompany this change, various tools will have to be implemented: ending harmful subsidies (to agriculture, fisheries and fossil fuels), developing ambitious domestic standards and applying them to imported products and/or carbon adjustment measures at borders, adjusting tariffs according to the environmental quality of goods, systematic inclusion in trade agreements TSD chapters of measures and standards related to circular economy, trade in waste and scrap and the use of secondary materials... etc. These diverse measures will be developed in the Jacques Delors Institute's upcoming publications.

6. Trade itself will be transformed: the relative share of raw materials is expected to decrease, and its carbon content reduced as a result of border adjustment measures and the application of equivalent standards to imported products. Freight transport methods are also expected to undergo major changes. To achieve the zero emissions target by 2050, maritime freight companies are moving towards technologies that no longer use fossil fuels.

7. Finally, the energy transition will impact the geography and composition of world trade, the weight of energy dependence shifting from global markets to regional networks. The fossil fuel trade, which currently accounts for 15% of traded goods, will be reduced while three other sectors are expected to increase[35]:

- trade in goods and technologies related to the energy transition;
- electricity exchange, benefiting from better connected and more stable networks;
- trade in renewable fuels, which will be expected to see significant growth (hydrogen, synthetic fuels ... etc).

33. UN Environment (2017)
34. OECD (2017)
35. IRENA report (Lamy *et al.*), *A New World : The Geopolitics of the Energy Transition* (2019); https://geopoliticsofrenewables.org/assets/geopolitics/Reports/wp-content/uploads/2019/01/Global_commission_renewable_energy_2019.pdf

CONCLUSION

The challenge awaiting the European Union in the years to come will therefore be using its trade policy as an "accelerator" of vital transitions the world needs. This will be done via the exportation of European environmental norms and standards, regulation of transport-related CO2 emissions, negotiation of ambitious bilateral and multilateral agreements, and the continuation of working towards inclusive trade relations, while also taking the path of ambitious decarbonisation embodied in its internal policies. These avenues[36] will be the subject of future publications by the Jacques Delors Institute in this series, "Greening Trade Policy".

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