



# **Young Europeans: How to Act on the Climate Crisis?**

A Scenario of Life for European Citizens in 2030

An Integrated Vision as a Psychological Tool to  
Accompany the Implementation of Stringent  
Environmental Policies in the European Union.

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## Notes of the author

My name is Mathilde.

Statistically, I am a speck of dust in the space and time frame of this planet.

Today, I don't know anymore how to deal with the huge amount of energy that I feel rising from a constant feeling of frustration and sense of guilt towards the environmental crisis, and that is slowly turning into anger.

I hear every day, from the media and the people in my surroundings that we are the generation that will save the world, that change will arise from young generations, that we represent hope for the needed transition, and the future in general.

But how do you dare to ask us to carry the weight of these expectations on our shoulders?

The irresponsibility of 200 years of human choices based on individual profit, perpetual economic growth, and over-consumption should not cost us our lives and the ones of our children.

Furthermore, we cannot afford the luxury to wait for my generation to reach the structural positions which allow implementing the needed stringent actions.

The transition of our society, that should in fact be named revolution of society given the immense scale of the task, should have started yesterday.

Supporting and implementing these revolutionary changes today constitutes at the very least an absolute necessity.

*“A map of the world that does not include Utopia is not worth even glancing at, for it leaves out the one country at which Humanity is always landing. And when Humanity lands there, it looks out, and, seeing a better country, sets sail. Progress is the realization of Utopias.”*

Oscar Wilde

*” If you want to build a ship, don't drum up the men to gather wood, divide the work, and give orders. Instead, teach them to yearn for the vast and endless sea.”*

Antoine de Saint-Exupéry

## Abstract

There is no time anymore for trial and error with European policies to tackle climate change. From now on, it is an absolute urgency to establish, frame, and legislate the development of the pillars of the society needed in the near future in order to be consistent with EU environmental targets. The 2030 scenario acts as an integrated and projected vision of the lifestyle of citizens within a decade and is developed in the first part of the paper. The second part will cover the backcasting approach of the adaptations of rules, legislations, allocation of subsidies, and taxation system of this futuristic vision. Therefore, practical actions and thresholds will be elaborated to decrease significantly European individual carbon footprint from its current average value of 7.2 tons/year/person (which account only for national production-based emissions, without any consideration for indirect emissions from imported goods)<sup>1</sup> to 2.1 tons/year/person by 2030<sup>2</sup>.

This paper focuses on the living conditions of the 600 million European citizens in a 2030 scenario where climate change mitigation would be seen as an absolute priority. In that sense, the scenario is not only adding to environmental measures that are currently insufficient, but it rather defines an entirely new socio-economic paradigm that articulates these environmental and technological strategies with social, cultural, educational political and economic transitions. This explains the simultaneous (re)consideration of numerous societal aspects in order to foster synergies among them. These various domains encompass minimum standard of living for all, habitat and energy, food autonomy, water and electricity access, industry, mobility, consumption habits, time management, work, leisure time, travel behaviours, education, and healthcare.

Furthermore, the approach places human well-being and living standards at the centre of the development of Europe, dedicating its politics to the priority it should be aimed at: serving human beings equally. It also emphasises the social contribution and promotes a futuristic vision of the society to help European citizens understand the necessary behavioural and structural changes and to what world these would lead us. This new model would be significantly different from our current one, placing time as the critical variable of our lives

<sup>1</sup> Eurostat (2019). Statistics Explained: Greenhouse gas emission statistics – carbon footprints.

<sup>2</sup> Wynes, S. & Nicholas, A. K. (2017). The climate mitigation gap: education and government recommendations miss the most effective individual actions. *Environmental Research Letters*, 12(7).

(instead of capital), reinforcing equality among people, and providing all European inhabitants with a “basic security pack” defined according to resources availability<sup>3</sup>. Such an approach is essential to gain the trust and support from individuals, who will eventually have to radically change their behaviours and daily life habits. It appears obvious that neglecting social reaction to any environmental taxation, lifestyle change or loss of comfort threatens the long-term viability and stability of the entire system, as previously seen with the yellow vests’ movement in France.

The proposed analysis goes far beyond the EU 2030 environmental targets. It offers a common vision for European citizens, involving them into the process of drastically changing societal norms, discourses, attitudes, and behaviours. The tools of legislations, justice, taxation, and subsidies will trigger social protest and rebellion if these leverages are not explicitly accompanied by a wider vision of a future society in which Europeans can project themselves and the living conditions of their offspring. This analysis is strictly extrapolated from this envisioning exercise, and the dramatic legislative, legal, institutional, and practical transitions are derived from this human perspective. Moreover, this transdisciplinary approach does not keep this vision restricted to greenhouse gas emission cuts, energy production, and technical improvements in industrial efficiency. As a matter of fact, this will not be sufficient<sup>4</sup>. Our best chance to mitigate climate change effects lies in an integrated and Europe-wide vision of societal transformation, taking into consideration individual consumption, time management, and wealth distribution. Practical measures supporting these aspects would be the promotion of object libraries, second hand and shared ownership, the reduction of labour time, and the establishment of community service work, as well as minimum and maximum salary limits<sup>5</sup>.

These would already lead to an effective reduction of greenhouse gas emissions, but more importantly, it would play a crucial role in the process of acceptance and willingness of individuals to contribute to societal changes. The perceived distance of citizens to European political debate is one of the major hurdles of our times, and the politics have a lot to gain from the reliance and confidence of their citizens<sup>5</sup>. Their support and contribution to this

<sup>3</sup> Chomé, F. (2019). Pour un nouveau contrat social : Démocratique, écologique, solidaire.

<sup>4</sup> Jackson, T. (2016). Prosperity without growth: foundations for the economy of tomorrow.

<sup>5</sup> European Commission (2015). The Eurozone’s Crisis of Democratic Legitimacy: Can the EU Rebuild Public Trust and Support for European Economic Integration? Fellowship initiative 2014-2015: Growth, integration and structural convergence revisited. DOI: 10.2765/5015

tremendous challenge are highly dependent on their ability to understand the purpose of the measures and to have a vision of a different future than the one we desperately try to avoid.

What should our world look like in 2030 if we still want to be here in 2050, and how do we get there?

Keywords: vision, backcasting approach, communication, European Union, behavioural changes, standards of living, environmental policies, citizens' involvement, social justice

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# 1. Introduction

## 1.1 Strengthening bottom-up citizens' actions by a political top-down approach

Nowadays, it is an absolute urgency to establish, frame, and legislate the development of the pillars of the society needed in the near future in order to be consistent with an individual carbon footprint of 2.1 tons of CO<sub>2</sub>-equivalent/year/person by 2030<sup>6</sup>. Radical changes need to occur in our European society to decrease significantly our individual carbon footprint from its current average value of 7.2 tons of CO<sub>2</sub>-equivalent /year/person (which already accounts only for national production-based emissions, without any consideration for indirect emissions from imported goods)<sup>7</sup>, and deeply lower our responsibility in global fossil fuel consumption, which is still rising today<sup>8</sup>. A top-down legislative and political approach of a socio-economic transition at the EU level by 2030 would be an impactful and time-efficient response to the need for climate change mitigation actions. However, the use of the tools of legislation, justice, taxation, and subsidies is likely to trigger social protests and rebellions, as seen in the past. If citizens are not conscious of the overall long-term objectives of these stringent legislative changes, they will probably place themselves as opponents to the measures, becoming a hurdle for the motion of the transition of society. Therefore, these governmental leverages should be explicitly accompanied by psychological tools such as the spread of the vision of a future society in which citizens can project themselves and the living conditions of their offspring. Indeed, the transition towards a low carbon intensity society will necessitate to gain the confidence of EU civil society in their future, and to reinforce their faith in the environmental policies implemented by the State.

## 1.2 The objective of 2.1 tons CO<sub>2</sub>-equivalent/year/person

Most of the existing forecasting models underlying environmental agreements and protocols rely on the use of unproven negative emissions technologies<sup>9</sup>, making the development of these pathways to meet the Paris Agreement and the EU key targets for 2030 completely inconsistent with reality. Remaining under the target of 1.5°C of temperature

<sup>6</sup> Wynes, S. & Nicholas, A. K. (2017). The climate mitigation gap: education and government recommendations miss the most effective individual actions. *Environmental Research Letters*, 12(7).

<sup>7</sup> Eurostat (2019). *Statistics Explained: Greenhouse gas emission statistics – carbon footprints*.

<sup>8</sup> BP (2019). *BP Statistical Review of World Energy*.

<sup>9</sup> Fuss et al (2014). Betting on negative emissions. *Natural Climate Change*, 4, pp. 850-853.

elevation is a utopian idea if our actions are limited to the following ambitious objectives (which are even extremely unlikely to be achieved with our current strategy):

- An insufficient -40% cut of greenhouse gas emissions compared to 1990 levels<sup>10</sup>, because this target neglects the European responsibility on indirect emissions resulting from goods' and technologies' production and transportation occurring outside but consumed in the EU, the financial activities (insurance, savings, pensions, and investments), as well as air travel to foreign countries<sup>11</sup>.
- Some minor adjustments of our electricity production system (reach 32% share of renewable energy), considering that electricity represents barely 20% of our energy consumption and that renewable energy infrastructures have a consequent carbon footprint and a limited lifespan<sup>12</sup>.
- Idealistic improvements in energy efficiency (32.5%) that lead to a relative but not absolute decoupling of emissions/resource use and economic growth, since efficiency improvements in labour productivity or technologies drive down the costs of production and therefore stimulate the consumption (Jevon's paradox)<sup>13</sup>.

Instead, all European citizens need to accustom to a lifestyle approaching a 2.1 tons/person annual emissions budget necessary in the following decades<sup>14</sup> to have a chance to meet the official 2°C climate target (preferably 1.5°C) of the ratified December 2015 Paris Agreement<sup>15</sup>. This commitment has radical consequences on near-term and deep emissions cuts, and it will overall require the adaptation of the individual lifestyle choices and many behavioural changes in our Western civilisation<sup>16</sup> (see Figure 1 and Appendix F) who is estimated to produce nearly 50% of global emissions<sup>17</sup>. In order to reach this ambitious target,

<sup>10</sup> Chomé, F. (2019). Pour un nouveau contrat social : Démocratique, écologique, solidaire.

<sup>11</sup> Lakatos, K. (2019). *A small step for emissions accounting, a giant leap for sustainability? Unpacking the debate around the consumption-based emissions accounting method (Master Thesis)*. Lund University Center for Sustainability Studies. Sweden.

<sup>12</sup> European Commission (2015). The Eurozone's Crisis of Democratic Legitimacy: Can the EU Rebuild Public Trust and Support for European Economic Integration? Fellowship initiative 2014-2015: Growth, integration and structural convergence revisited. DOI: 10.2765/5015

<sup>13</sup> Jackson, T. (2016). Prosperity without growth: foundations for the economy of tomorrow.

<sup>14</sup> Girod, B., van Vuuren, D. P & Hertwich, E. G. (2014). Climate Policy through changing consumption choices: options and obstacles for reducing greenhouse gas emissions. *Global Environmental Change*, 25, pp. 5-15.

<sup>15</sup> U.N. (2015). *Paris Agreement*. Paris: U.N.

<sup>16</sup> Wynes, S. & Nicholas, A. K. (2017). The climate mitigation gap: education and government recommendations miss the most effective individual actions. *Environmental Research Letters*, 12(7).

<sup>17</sup> Gore, T. (2015). *Extreme Carbon Inequality: Why the Paris climate deal must put the poorest, lowest emitting and most vulnerable people*. In first Report Oxford: Oxfam International.

not only do we need to combine the use of national policies, major transformations in the energy sector, the infrastructures, and the institutions, but also to implement behavioural shifts of greater emissions reduction potential<sup>16</sup>. In that sense, the transition of society has to integrate all types of sectors, industrial activities, services, goods production and consumption patterns in order to coordinate all these measures and legislative steps towards the common goal of 2.1 tons CO<sub>2</sub>-equivalent/year/person, that is consistent with our environmental objectives, the climate crisis mitigation requirements and our sense of social justice.

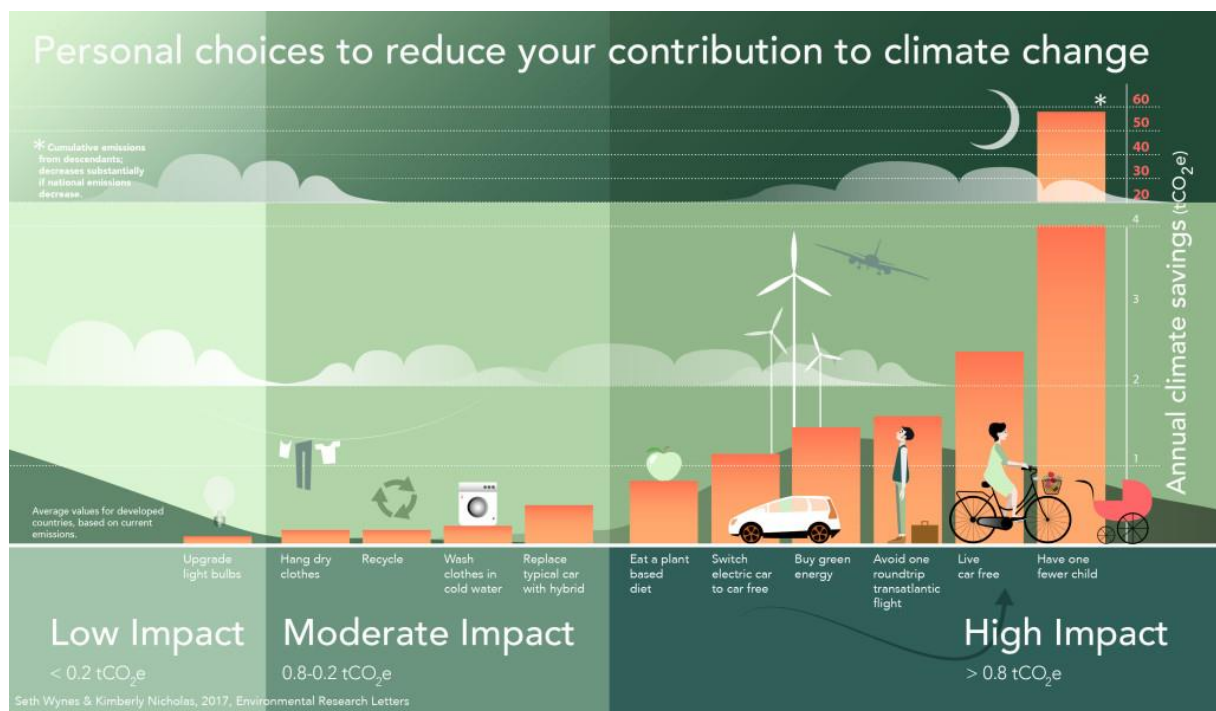


Figure 1: Personal choices to reduce your contribution to climate change (Wynes & Nicholas, 2017)<sup>18</sup>.

The most effective individual steps to tackle climate change aren't being discussed. A new study has identified the four actions that would have the greatest impact on an individual's greenhouse gas emissions: eating a plant-based diet, avoiding air travel, living car-free, and having fewer children.

### 1.3 A decade to stop the current catastrophic level of climate change

Scientists are numerous to claim that we should have started the transition decades ago<sup>19</sup>. The key question here is not to know "When do we have to start?", as the only

<sup>18</sup> <https://www.lunduniversity.lu.se/article/the-four-lifestyle-choices-that-most-reduce-your-carbon-footprint>

<sup>19</sup> Meadows, D. H., Meadows, D. L., Randers, J. & Behrens, W. W. (1972). *The Limits to Growth: a report for the club of Rome's project on the predicament of mankind*. Universe Books, New York, US

reasonable answer is *in the past*; but rather “How long does it take to undertake a deep and organised adaptation of the roots of our economic, political and social system?”.

The longer we wait, the higher the price to pay<sup>20</sup>.

The longer we wait, the higher the expected global warming<sup>21</sup>.

The longer we wait, the more hostile and less favourable our planet for the conservation and the development of life, natural ecosystems, diverse organisms, and human beings<sup>22</sup>.

The longer we wait, the more unfair the consequences. Because the first human beings to be severely impacted by climate change are and will be the population who contributed the least to the climate crisis<sup>23</sup>.

Therefore, the transition will have to support a high intensity and diversity of changes, on an extremely short timeline. We have the choice between a non-managed collapse (economic recession and social instability) that will occur in any cases if we perpetuate our model of economic growth and abusive standards of living, or a forced, collective, and embraced change towards a model of society that has sense, but whose first steps are likely to be perceived as uncomfortable for the continuity of our way of living.

## 1.4 Legislative changes at European Union scale

So far, the environmental policies have mainly been implemented nationally, without any sanctions and relying exclusively on the good faith of the national governments. In parallel to the implementation of these environmental targets, European countries are still required to respect other EU commitments and to meet economic goals, while depending on the international market to regulate the most emitting enterprises. This non-coordinated and fragmented decision-making process has led to the delocalisation of most emitting and polluting industries, the emergence of a trading system of CO<sub>2</sub>, massive unemployment, no real reduction measures, and no perceptible improvements in climate mitigation<sup>24</sup>. In that

<sup>20</sup> Stern, N. (2009). Action and ambition for a global deal in Copenhagen: policy paper. Centre for Climate Change Economics and Policy Grantham Research Institute on Climate Change and the Environment in collaboration with the United Nations Environment Programme (UNEP).

<sup>21</sup> IPCC. (2014). Summary for Policymakers. *Climate Change 2014: Mitigation of Climate Change*. Cambridge, United Kingdom and New York, NY, USA: Cambridge University Press.

<sup>22</sup> Hamilton, C. (2013). Requiem pour l'espèce humaine: Faire face à la réalité du changement climatique. Presses de Science Politiques

<sup>23</sup> U.N. (2015). *Paris Agreement*. Paris: U.N.

<sup>24</sup> IPCC. (2014). Summary for Policymakers. *Climate Change 2014: Mitigation of Climate Change*. Cambridge, United Kingdom and New York, NY, USA: Cambridge University Press.

sense, we can easily deduce that a few isolated measures and legislative steps will not be sufficient to make our world less greedy in energy and resources, and less generator of greenhouse gas emissions, waste, pollutions, sicknesses and frustration<sup>25</sup>.

The transition has the duty to redesign the system and reform its pillars, with deep economic, social and environmental consequences. This will require massive investments in alternative sectors and activities, but also divestments from fossil fuel-based goods and services, as well as a new governance model. Designing this unprecedented model at the scale of the European Union will ensure more reliability, support, self-sufficiency, legitimacy, and influence on international legislations and global long-term environmental strategy.

### **1.5 The notion of sobriety and happiness at the core of tomorrow's society, rather than a risky bet on scientific innovations**

So far, the most widespread response to climate change that has been implemented at a political level and researched at an academic level has been following a simplistic reactionary technocratic approach. The faith in science and human innovations is one of the most common and strongest discourses of our times. However, when confronting this hope with our previsions for the near-term future, it suddenly loses its validity and appeal. Indeed, the impact of human activity is the product of three factors: the size of the population, the level of affluence (expressed in the European Union as the income per person), and the carbon intensity (or technology intensity) factor which measures the impact associated with each wealth unit we spend<sup>26</sup>. Therefore, it is essential to ask ourselves “Can we achieve a sufficient decrease in carbon intensity through efficiency gains in the future to continue to pursue the financialisation of our economy, an exacerbated form of capitalism and mass consumption, while remaining within the safe operating space of our finite planet?”<sup>26</sup>

The only plausible answer to this key question is no. By 2050, the world population is expected to account for 9.7 billion human beings, CO<sub>2</sub>-equivalent emissions are expected to double and the global economy will be 11 times larger in terms of transactions if we perpetuate our current strategy of “science and innovation will solve the environmental crisis”<sup>26</sup>. This means that in order to make the carbon intensity declines faster than the sum of the impacts of growth rates of population and income, the reduction of global carbon intensity should be 50 times faster than its decline rate of the last decade<sup>26</sup>. This leads us to another

<sup>25</sup> Chomé, F. (2019). Pour un nouveau contrat social : Démocratique, écologique, solidaire.

<sup>26</sup> Jackson, T. (2016). Prosperity without growth: foundations for the economy of tomorrow.

critical question that is not “Whether the complete decarbonisation of our energy systems or the dematerialisation of our consumption patterns is technically feasible?”, but “Whether it is possible in our kind of society?”<sup>26</sup>. Deep cuts in emissions and resources use cannot be achieved without confronting the in-depth structure of our socio-economic paradigm. We desperately need to establish a new philosophy of life in which environmental limits are the basis of this new model, and disruptive economy guarantees our standards of living to be in balance and adequate with our environment.<sup>25</sup>

## 2. The 3 pillars of the scenario 2030

### 2.1 Time as a critical variable of our lives

The 2030 scenario gravitates around the notion of re-appropriation of time. Time management represents the first factor for a good quality of life. Interestingly, working time accounts on average for 10% of our disposable lifetime, whereas we spend the rest of our lifetime learning, taking part in the education system, sleeping, socialising, eating. Yet, our working time represents more than 70% of the importance of our lives<sup>27</sup>. This is particularly apparent when looking at the deviances of the employment system: burn-out, segregation pressure, boring working position, sicknesses, tiredness, side addictions, anxiety...

The majority of the rules of our society have been implemented at a time when the share of working time in our lives was much heavier, representing 25-30% of our lifetime<sup>27</sup>. The resulting paradox of this old-fashioned system is the abundant amount of non-working time we have today, and our difficulty to fully grasp it. Indeed, time is now an extremely well-exploited resource of society, where time-efficiency is the new dominant model. In that sense, time compression has made us dependant on the idea of the necessity to combine the largest load of activities into the shortest amount of time. This professional rule has often, if not always, pervaded our private life, in which we took the habit to “make the most of our free time” in terms of consumption, travel, discoveries, ...

The 2030 scenario will necessitate the reconsideration of time in a healthy lifestyle as the variable/capital to maximise. Its wise management will help us take control again on our bodies, to do things autonomously, and to promote the process of reconnections with other human beings and nature. This future society will foster the feeling of emancipation of its citizens through self-realisation rather than frustration through comparison, that results from the current societal disparities.

### 2.2 Equality as key value

Asking EU citizens to accept, support and contribute to a societal transition that will lead them towards lower standards of living is not an easy political pathway. However, past events have shown that, more than the individual restriction of material freedoms, the inequalities of consequences of environmental policies among different parts of the

<sup>27</sup> Viard, J. (2009). Le loisir en Europe: quelques chiffres et quelques pistes. *Observatoire québécois du loisir*, 6(12), pp. 1-4.

population are likely to trigger a violent and defensive response of civil society. Perception of unfairness is indeed the most common initiating factor of social revolts<sup>28</sup>. The 2030 scenario is centred around the ideal of equality among EU citizens. Indeed, in order to build a collective society together, the EU citizens need to be convinced that they benefit from the same conditions and privileges as any member of society. Historically, European inequalities between rich, middle and poor classes have been rising since the beginning of industrial revolution<sup>29</sup>. The reinforcement of equity of access to resources, goods, and services can decrease the comparison pressure and benchmark, and lead to a widespread phenomenon of re-focus on what makes sense in our lives<sup>30</sup>. Because money, as useful as it is, is meaningless, we should not forget that its accumulation is a mean rather than the ultimate goal of life. Therefore, equality in the 2030 scenario is practically adopted through the annual allocation of resources' bundles rather than the redistribution of monetary capital. Indeed, the importance of the monetary capital is problematic in itself and should be actively and drastically decreased to be replaced by a deeper consideration for tangible human needs.

## 2.3 Basic security pack

Providing all citizens with minimum standards of living should be at the core of the society of tomorrow. Reducing inequalities and allocating wisely resources would allow to provide all human beings with a basic security pack<sup>31</sup>. However, the pyramid of Maslow (see Figure 2) describes human needs far beyond the physiologic and material needs, emphasising the consideration for needs for safety, belonging and love, self-consideration and finally self-actualisation<sup>32</sup>. Therefore, the basic security pack intends to meet diverse individual basic needs, such as decent housing, water, electricity and heat access, but also mobility, education, a decent mean of subsistence, healthcare, ... Each of these pillars are indispensable for the overall balance of individuals. Decent and sober life conditions also necessitate tools and means to promote self-sufficiency in food production through access to land, ancestral knowledge and community support <sup>32</sup>.

<sup>28</sup> Rickardsson, J. & Mellander, C. (2017). *Absolute vs Relative Income and Life Satisfaction*. CESIS Electronic Working Paper Series, 451; Wilkinson, R. & Pickett, K. (2009). *The Spirit Level: Why Equality is Better for Everyone*. Penguin Books Ltd, United Kingdom.

<sup>29</sup> World Inequality Database (2019). How equal is Europe? Evidence from distributional National Accounts. Working Paper of WID, 6.

<sup>30</sup> Max-Neef, M. (1992). *Development and Human Needs*. The Apex Press

<sup>31</sup> Chomé, F. (2019). Pour un nouveau contrat social : Démocratique, écologique, solidaire.

<sup>32</sup> Maslow, A. H. (1943). A Theory of Human Motivation. *Psychological Review*, 50, pp. 370-396.



Similarly, access to goods should not be a matter of purchasing power anymore but it should represent the outcomes of humans' autonomous abilities to create clothing, furniture, art, games, ... Indeed, self-realisation has been proven to be a rewarding process, bringing meaning to our lives and encouraging sustainable behaviours, relocalisation of production, long-term lifespan, and sense of community building<sup>33</sup>. Therefore, the role of the State in this objective is to provide its citizens with access to primary materials (wood, fabric, wire, manufacturing tools, recycled materials) and space for the creation process, assistance by a skilled network, as well as knowledge through formation and education. Beyond these practical requirements, the State is responsible for providing citizens with sufficient leisure time, activating their thirst for learning, as well as inverting the current discourse and narratives of rewarding life from consumerism to independence, from wealth accumulation to sobriety.

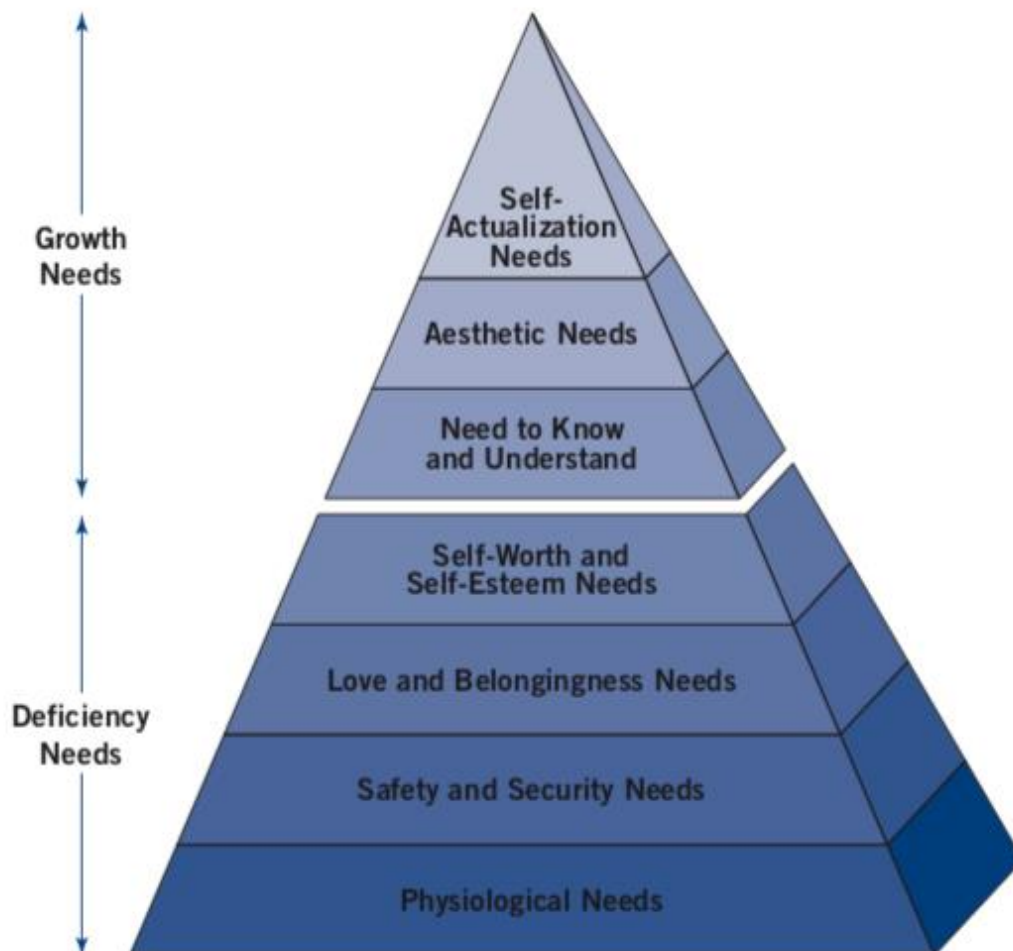


Figure 2: Maslow's hierarchy of needs (Maslow, 1943)<sup>34</sup>

<sup>33</sup> Max-Neef, M. (1992). *Development and Human Needs*. The Apex Press

<sup>34</sup> [https://www.cengage.com/resource\\_uploads/downloads/0495570540\\_162121.pdf](https://www.cengage.com/resource_uploads/downloads/0495570540_162121.pdf)

## 2.4 A new socio-economic model

The transition towards a low carbon intensity society will necessitate to gain the confidence of EU citizens in their future, and to reinforce their faith in the environmental policies implemented by the State to reach a resilient society. If citizens are not conscious of the overall long-term objectives of these stringent legislative structures, they might place themselves as opponents to the measures, becoming a hurdle for the stability of society. On the opposite side, society shifts which are supported and driven by the population itself have historically been seen to lead most efficiently to a new stable system<sup>35</sup>. Revolts against environmental policies under the form of strikes, demonstrations, and social movements such as the Yellow Vests' movement, are legitimate since these measures do not impact all actors of civil society equally. Anger rising from the sense of injustice can be avoided if material and consumption freedoms are restricted equally for citizens, if the environmental transition is coupled with a social and economic one, leading towards a fairer distribution of resources. Tomorrow's society has to be constructed around an entirely new socio-economic model.

The achievement of the ambitious and necessary environmental targets requires us to cut by 80% the total amount of direct and indirect emissions by 2030 compared to 2016 (see 3.1). Furthermore, as the world appears increasingly economically, socially and climatically constrained, not only does it stress the urgency for a drastic reduction of our emissions and adaptation to consequences of the climate crisis, but it also emphasises the need for redefinition of the common imaginary frame, the set of societal discourses and narratives for our future. This inner and collective transformation is an absolute prerequisite to make the transition not only viable but also desirable for the actors of change: all citizens

Considering the urgency of the paradigm and mindset's shift, it is essential to draw the frame of a new social contract between EU citizens and the governance structures, to provide each EU citizen with safety and trust in the future, and a positive long-term life perspective. However, to lead the necessary world transition that undertakes deep mutations of the historical pillars and roots of our society, we first need to consider a social prerequisite. Human beings need to find meaning in their lives, to feel confident in their future and their ability to meet their basic needs. This condition needs to be fulfilled before citizens feel empowered to undertake any behavioural changes, to make environmentally-conscious lifestyle choices and to support policies aiming at reducing the carbon impact of our lives<sup>36</sup>.

<sup>35</sup> Hallam, R. (2019). *Common sense for the 21<sup>st</sup> century*.

<sup>36</sup> Chomé, F. (2019). Pour un nouveau contrat social : Démocratique, écologique, solidaire.

### 3. A scenario of life 2030 consistent with an individual carbon footprint of 2.1 tons CO<sub>2</sub>-equivalent/year/person

#### 3.1 Prerequisite assumptions for scenario 2030

The following scenario was inspired by various pre-existing visions, my imagination, diverse lectures I attended and papers I read <sup>37</sup>. The underlying assumptions of the scenario 2030 encompass variables from different types.

First of all, the native European population is assumed to remain constant in the EU, as the birth rate has been reaching a plateau these last years<sup>38</sup>. However, climate refugees displaced by natural extreme events, changing weather conditions impacting negatively food production, and conflicts arising due to climate change are likely to be incredibly more numerous than expected. Future predictions vary from 70 million to 1 billion of climate refugees by 2050<sup>39</sup>. Therefore, this scenario considers a probable increase of the EU population, since preventing a displaced population from seeking refuge in Europe would be the height of hypocrisy, injustice, and inhumanity, regarding our historical responsibility in the climate crisis.

Secondly, technologic processes of carbon extraction from the atmosphere, nanotechnology, genetic engineering, geoengineering, and artificial intelligence have been considered as niches in scientific research, but practically inapplicable on a large-scale and short-term basis. On the contrary, the tremendous amount of time, carbon-intensive resources, money and brilliant minds which are involved in research in these fields are misleading

<sup>37</sup> European Commission (2018). In-depth analysis in support of the Commission Communication: A Clean Planet for all: A European long-term strategic vision for a prosperous, modern, competitive and climate neutral economy

Stockholm Resilience Centre (2018). *Transformation is feasible: How to achieve the Sustainable Development Goals within Planetary Boundaries*

Svenfelt, A., Afredsson, C. E., Bradley, K., Fauré, E., Finnveden, G., Fuerhrer, P., (...), Öhlund, E. (2019). *Scenarios for sustainable futures beyond GDP growth 2050. Futures, 111*, pp. 1-14.

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Frase, P. (2016). *Four Futures: Life After Capitalism*. Verso. London. United Kingdom.

Höjer, M., Gullberg, A. & Pettersson, R. (2011). *Images of the Future City: Time and Space For Sustainable Development*. Springer.

Asplund, G., Gahn, W., Markelius, S., Sundahl, E. & Åhrén, U. (1931). *Acceptera manifesto*. Sweden.

<sup>38</sup> The World Bank (2019a). Birth rate, crude (per 1,000 people) – European Union.

<sup>39</sup> IOM (2008). *Migration and Climate Change*. Migration Research Series, No 31. IOM. Geneva.

human beings about their ability to overcome the climate crisis following the same foolish mindset as they historically did. This vision, unlike most current pathways to stay under the 1.5°C limit<sup>40</sup>, does not assume the future use of unproven technologies to achieve negative emissions. We have no guarantee that our science will evolve fast enough to respond to the challenges of climate mitigation and adaptation. The precautionary principle should be the core assumption of our transition, especially regarding the immensity of what is at risk in this crisis. These potential technological innovations often only address carbon emissions, and neglect other environmental challenges, such as resource depletion, ocean acidification, waste production and pollution. Besides, we shall not forget that we are constrained by the insurmountable barriers of physical laws of the universe and the natural realities of our planet. Lastly, a technocratic approach might only delay the inevitable, putting the responsibility to deal with the problem resolution on the shoulders of the future generations.

The overall target of “dividing by 5 the greenhouse gas emissions of EU” relies on the idea that human civilisation is currently and globally extracting and injecting into the atmosphere 53 billion tons of CO<sub>2</sub>-equivalent per year<sup>41</sup>. On the other side, the carbon absorption capacity of natural ecosystems through biological (photosynthesis by plants) and chemical (absorption and storage by oceans and soils) processes is currently assessed as equivalent, at best, to approximately 10 billion tons of CO<sub>2</sub><sup>42</sup>. De facto, the captured carbon flows occurring predominantly in large forests and the open ocean would make us achieve carbon neutrality if our anthropogenic emissions are reduced by 80%. However, the target of “divide by 5 our global GHG emissions” is already underestimating the extent of the efforts that are necessary to sustain for three reasons. The first one is that these natural processes of absorption are likely to be disturbed in the short run by the current phenomena of intensive deforestation and stratification of oceans resulting from temperature rise. The second underlying optimistic assumption is that climate change will not lead to the crossing of multiple tipping points of our climate systems<sup>43</sup> or that no major disturbance of natural processes and fragile equilibriums will occur. The last reality to consider is that GHG emissions’ accumulation in the atmosphere is a cumulative process, and therefore it contributes exponentially to the greenhouse gas effect. This latter is expected to be reinforced

<sup>40</sup> Fuss et al (2014). Betting on negative emissions. *Natural Climate Change*, 4, pp. 850-853.

<sup>41</sup> United Nations Environment Programme (2018). *Emissions Gap Report 2018*.

<sup>42</sup> IPCC (2013). WG1 Report of IPCC 5 AR, p. 471.

<sup>43</sup> IPCC. (2014). Summary for Policymakers. *Climate Change 2014: Mitigation of Climate Change*. Cambridge, United Kingdom and New York, NY, USA: Cambridge University Press.

for at least 25 years from now on, considering the duration of the transition period and the long-term impact of GHG emissions. In order to reverse the balance of ecosystems and clean the atmosphere from its accumulated emissions, we need to even go beyond the pace of natural carbon absorption.

Finally, the scenario relies on the assumption that birth control should only be an emergency measure and the very last right to be restricted to mitigate climate change. Indeed, the freedom to have children, form a family and perpetuate life is written so deeply in our genes and in the core mechanisms of life itself, that the limitation of this freedom should occur only as a last resort. Moreover, the Kaya equation  $I = PAT$  offers further opportunities to take actions on different parameters, such as the carbon intensity of energy, the energetic intensity of a wealth unit, and the wealth per inhabitant.<sup>44</sup>

### 3.2 General objectives by 2030

These general targets should serve as guidelines to assess if policies under discussion are rigorous enough to meet our environmental and climatic targets of reaching carbon neutrality within the next decades<sup>45</sup>:

- Divide by 5 the greenhouse gas emissions of the European Union within 10 years.
- Divide by 4 the energy consumption of all average European buildings.
- Divide by 2 the carbon intensity of each energy unit consumed in European buildings, on average.
- Undertake a massive deployment of decentralised renewable energy production, aiming at making European buildings more independent and autonomous from the electric network.
- Divide by 3 the energy consumption of EU citizens' mobility.
- Divide by 2 the energy of goods' production and transportation.
- Divide by 5 the general carbon footprint resulting from goods importation (indirect emissions)
- Drastically divide the financial speculation and transactions.

<sup>44</sup> Jackson, T. (2016). Prosperity without growth: foundations for the economy of tomorrow.

<sup>45</sup> IPCC (2013). WG1 Report of IPCC 5 AR, p. 471.

IPCC. (2014). Summary for Policymakers. *Climate Change 2014: Mitigation of Climate Change*. Cambridge, United Kingdom and New York, NY, USA: Cambridge University Press.

Chomé, F. (2019). Pour un nouveau contrat social : Démocratique, écologique, solidaire.

- Drastically increase the investments in the local economy, through the re-allocation of capital for an action-oriented economy and societal transition.
- Ameliorate the standards of living of the currently-disfavoured share of the population by providing all citizens with access to a basic security pack.
- Eradicate unemployment through redistribution of the workload among citizens under the form of necessary and sustainable activities contributing to the general good of civil society.
- Get rid of health issues linked to professional pressure and stress, leading to reduced public health costs. Healthcare services are free for all citizens until 65 years old.
- Dispose of the pension system, as work is not perceived as a mandatory activity anymore, and EU citizens can live with a very small amount of money.
- Take measures to avoid the rebound effect. As the amount of leisure time is being drastically increased, we need to parallelly limit material temptations of over-consumption. Beyond the basic material needs, leisure types available for the population have to be oriented towards low carbon intensity activities (art, music, ...)
- Impose legitimately high restrictions on remunerations and wage gaps, in order to make the system more equalitarian.

### **3.3 Money, power, ownership and time perception**

The shift towards a new model of society necessitates the development, restructuration, and establishment of material, practical, and legislative measures. However, it also implies more generally a need to revise and reconsider our relationship and inner approach to money, power, ownership, and time. By 2030, this cultural shift has been accompanied by structural changes, such as the legal reduction of working week, the education system teaching children to value their leisure time, the promotion of collectively-owned material and property, the re-appropriation of democracy by citizens, as well as the universal set of basic services provided to any citizen. Unlike the universal salary, the basic security pack does not rely on the attempt of vanishing monetary inequalities, but it rather focuses on addressing more directly inequities and the heterogenous access to goods and services of the population. The remaining share of monetary exchanges occurs primarily in local currency, promoting the local production and consumption, and the consideration of contextual social, economic, and environmental factors. The use of these complementary currencies reduces the extent of the negative impacts of global currency such as power

concentration, increase in social inequalities, intensified local vulnerability, negative environmental impacts, and lack of transparency. Diminishing the reliance on money of EU citizens, especially for the most basic needs (food, water, shelter, healthcare, education), has led to the revalorisation of other variables as key features of our lives, such as time, autonomy, and human bounds.

### **3.4 Work, employment, activities, leisure time**

The 2030 society has revolutionised the concept of working week, shifting to 20 hours for everyone, with an additional 5 hours for community work. Indeed, heavy workload used to lead to more unsustainable consumerism due to a fast life pace. Citizens had less time to create, recycle, transform their goods, and they were more likely to make time-efficient lifestyle choices, rather than a resource or money-efficient choices. Moreover, a half-cut working week drastically reduces the physical and psychological pressure of work. It allocates free time for other important, and so-far often neglected, aspects of life, such as family life, social connections, physical exercise, musical development, and community building. The flexibility around the 20 hours average working week allows citizens to choose between 6 months of 40 working hours/week followed by 6 months of free time or a year-long distributed workload. Workers get paid all along the year in both cases, for a minimum wage of 1200 euros-equivalent net per month. However, the option of receiving a share of the salary in local (regional or national) currency is financially encouraged, as it guarantees the circular use of money to pay for basic needs. This salary is consistent with the price rates of energy, water, food, and shelter capped bundles, allowing all citizens to meet their basic requirements.

The gap between the lowest and the highest revenue of all professional activities is a factor 4, and can be envisioned to be progressively decreased with time. Therefore, the salaries are capped in the first instance to 5000 euros-equivalent per month. It is also forbidden to cumulate the remuneration of two different jobs, aiming at liberating some time for group activities, manual work, and community work. The community work is recognised as “activities contributing to the well-being of society as a whole”. Temporary unemployed people are at disposal for the State request of public services and community work for 20 hours per week.

### 3.5 Housing, construction, renovation

The tremendous requirement of non-renewable resources, energy and land surface of the construction sector justifies a deep reshaping process of the housing sector. By 2030, society has interrupted the construction of new buildings and cities' expansion processes to focus instead on the massive reconditioning of existing buildings according to the tangible needs of society. The construction sector allocates 100% of its energy and resources to renovate and transform residential areas and tertiary sector buildings. The sporadic remaining construction work is articulated around eco-materials use and is limited by the discouragement of the misuse of living surface through a differentiating taxation system. In tomorrow's society, every EU inhabitant has access to approximately 35 square metres of living space (not including technical spaces) at a very affordable renting prices and non-taxed in case of buying prices. Beyond the threshold of 35 square metres/person, the State imposes an exponential taxation system for every additional square metre/inhabitant. Secondary residences are highly taxed as unused buildings, aiming at including these secondary houses in the renting network. The State capes the resell prices of housing in order to avoid house speculation and to guarantee all citizens a right to housing. This strict framework ensures that houses on the market are consistent with the differentiated taxation system according to the house's surface.

Employers must provide their employees with housing adapted to the size of the family for a fair price in the vicinity (within a bike-reaching distance) of the working area. This facilitates employee's mobility, reduces greenhouse gas emissions from transports and promotes a healthy work-life balance. The small size of houses leads to the reduction of accumulation of goods and furniture, as well as to the facilitation of professional mobility. Culturally, citizens attribute less importance to their habitation, so relocations are highly facilitated. Indeed, what used to be a material extension of ourselves is now perceived as a simple housing compatible with the family situation, the number of inhabitants, and the professional activities currently undertaken. The families or individuals move according to the location of their job, the teaching place for their children, or their interests. Ultimately, the ease of relocalisation leads to a decrease in mobility pressure and the environmental costs it represents.



### 3.6 Energy production and consumption

Each year, every EU citizen has access to 300-400 kWh of electricity at an affordable price. The State provides subsidies, assistance, and advice for self-production and self-consumption in micro-network with the neighbourhood, or for an individual house. Indeed, the transition aims at creating energetic autonomy off-grid of one neighbourhood, one collective building or one micro-network. The means to achieve this independence are various: cogeneration of wood, micro wind turbines, thermal or electric solar installations, biomethanisation plant using agricultural waste at communal scale, heat pumps, or any form of new renewable energy. The sharing of energy between neighbours, districts, and producers-consumers is legalised and encouraged. No legislation requires a licence to commercialise energy in a closed network. Moreover, low carbon and low-technology energy storage infrastructure are available and shared collectively. On request, each inhabitant can receive an allocated number of cube metres of wood, for heating purposes. This is particularly useful for the transitional period. Indeed, depending on the state of the building and the difficulty to insulate it, wood heating is a temporary alternative to oil-fired heating. Ultimately, all houses will be highly insulated and the heating will be provided by electricity from renewable-based generation.

The subsidies on hydrocarbons in the energy sector are completely abolished, and the focus is shifting towards renewable energy produced nationally, if not regionally. However, a drastic reduction of the energy consumption of every single EU inhabitant is an essential prerequisite, due to the embedded carbon-equivalent emissions of highly-technological solar panels, wind turbines, and other renewable energy production infrastructures<sup>46</sup>. Further, the optimistic discourse around renewable energy often forgets to mention that renewable production concerns electricity production, which in itself only accounts for 20% of our energy consumption. Therefore, a transformation of our consumption habits is inescapable.

Lastly, the transition period from 2020 to 2030 in the housing sector is dominated by the phenomenon of house insulation, which has become a national obligation. The right to insulation leads to systematic insulation (with State intervention to provide replacement housing for the duration of the work). The insulation process is financed by the State but reimbursed monthly by residents on a long-term basis. Insulation work is organised geographically, neighbourhood by neighbourhood, in order to maximise energy efficiency and

<sup>46</sup> de Chalendar, J. A. & Benson, S.M. (2019). Why 100% Renewable Energy Is Not Enough? *Joule*, 3(6), pp. 1389-1393.

minimise the execution time. As fossil fuel consumption for houses heating is taxed from the first year of the transition, there is a strong financial incentive to insulate houses and replace hydrocarbons by wood heating systems as a transitional system.

### **3.7 Water**

Each year, every EU citizen is offered an equal allocated number of cube metres of water at a reasonable fixed price, free of any taxation. Beyond this bundle, water consumption is taxed by the State, by 3 to 5 different exponential taxation steps, depending on the extent of the excess. The tax rate of these steps increases yearly, allowing citizens to have clear expectations and transparency for future costs of behavioural excesses. The State also supports and encourages the installation of infrastructures for the collection, filtration, and purification of rainwater through subsidies. Indeed, the unbalanced occurrence and increase in the frequency of extreme events in terms of precipitation represent a major risk on the sewage system for the future.

### **3.8 Food system, agriculture, eating habits**

The food system of 2030 is centred around the objective of food autonomy, especially in geographical areas around urban high-density zones. In that sense, the food flows are massively reduced, production is diversified and consumption is adaptively shifting towards plant-based, localised and diversified food. Moreover, the precaution principle is widely applied in food chain, relying on strong and scientific studies and leading to a drastic decrease of diet-related diseases. Parallely, the responsibility of a food brand is extended upstream and downstream, involving environmental externalities of production and health impact of the consumption of their products in the long term. A systematic carbon footprint calculation is mandatory before the availability of a food product on the market, with the holistic consideration of crops, transformation, storage, transport, and packaging. The prices of products no longer depend on market mechanisms but are rationally calculated according to their environmental impacts. An ecological VAT intends to make low carbon intensity food consumption less expensive, and therefore to structurally promote good decision-making of consumers.

On request, each household or combined family has access to one hectare/person of arable land within accessible distance from their house to be self-sufficient in food production, if they desire it. These new production landscapes are dominated by living

cultures, permaculture, polyculture, perennial crops, and non-labour agriculture systems. The notion of organic agriculture has become the norm in food production. Adapted and integrative policies are not limited to setting quantitative quotas of pesticides anymore, as this indication neglects the environmental impacts of the different types of agriculture, the origin of food production and the impacts on the carbon content of the soils.

The importance of breeding activities and the presence of cattle in the European landscapes are significantly aborted. The remaining production of meat and animal-based foods is developed on local and extensive farming activities. The animals are fed with herbs and local vegetal proteins, in controlled outdoor conditions of living. Meat-and-bone meal is forbidden, as well as complex industrially-composed cattle food. Similarly, vegetal proteins are banned from importation, as soya production is the major driver for deforestation in other parts of the world, and the energy efficiency of vegetal calories is particularly low for meat consumption. The presence of animal products in the food chain implies an incredibly inefficient loss of calories. Considering the population growth and the necessity to maintain our natural ecosystems as carbon stocks, meat-consumption is a luxury we cannot afford to the same extent as 2020. Animals are slaughtered by small scale local workers who respect food chain demand to erase the aberration of animal-based food waste. In terms of eating habits, EU inhabitants have drastically reduced the share of meat in their diet, for ethical, animal-right or economical purposes. The animal-based products are produced and consumed locally, through a direct selling process. The State taxes the consumption of different types of animal fibres and dairy products accordingly to their carbon footprints. Similarly, ultra-transformed food containing many different ingredients is banned from the food market. The consumption of transformed foods is discouraged for the benefit of bulk food, as EU citizens have now more time for meals preparation.

The right of access to land is an opportunity to review our notion of private and public lands. The privacy of some lands does not prevent other citizens to enjoy access to green spaces. On the other side, citizens are encouraged to run and appropriate themselves projects on public lands. Breeding activities can be implemented locally and on a small-scale, mainly through collective project rather than private and profit-driven activity. Agriculture parcels are mutualised to share equipment and machines necessary for the exploitation of lands. Professionals in the agriculture production system remain major actors in the food system, but the professionalisation of production is organised and clearly articulated with a consumption chain, inspired by the model of Agricultural Marketing Cooperatives with Direct Selling.

### 3.9 Human mobility

By 2030, the number of cars circulating has drastically been reduced, as well as distance travelled per person per year. Apart from these behavioural changes, some technological improvements have led to lower carbon emissions per kilometre, as well as a lower embedded carbon footprint of each vehicle, including emissions from fabrication and transport. Overall, we see a widespread increase in and extension of alternatives to individual car transportation. This phenomenon is partially driven by the shortened distance between living space, school, and workplace due to the housing legislation.

Every citizen of the EU has free access to a human propulsion vehicle. Indeed, vehicles which are driven by human and animal energy benefit from a complete detaxation. The private ownership of these non-emitting transportation means remains a common option, but the location of good-quality material is encouraged, especially for cargo-bikes. The lifespan of bikes and other soft mobility means has drastically risen, extended by the existence of bike repair shops and a collective mentality of “fix it yourself”.

Regarding the traffic situation, the dominant actor in circulation has shifted from fossil-based cars to soft mobility. Thanks to the progressive reduction of the surface dedicated to car use from 2020, the conversion of areas for the benefits of bikes, pedestrians and public transportation has increased the network connectivity. Besides, safe bike parking infrastructures have been massively deployed in urban areas. However, encouraging the use of bikes and public transportation has not been a sufficient measure in itself. It was accompanied and supported by the discouragement of environmentally harmful behaviours. Thus, every single new car crossing sensible (in terms of car density) borders is now required to pay a circulation tax, differentiated for different types, sizes, and occupancy rates of car;

In terms of infrastructure, the construction of new roads, public and private parking lots, as well as the development of diesel cars is interrupted by 2030, urged by the need to get out of fossil fuels for human mobility. Thermic cars have already been forbidden on the market since 2020, and their circulation is completely abolished by 2030. All types of fossil fuels must include a monthly incremental European taxation, and first-generation biofuels production (soya, palm oil) is strictly forbidden since 2020, due to the deforestation pressure it encompasses. Bioenergy production from agricultural waste remains acceptable. The maintenance on European highways is also disrupted, and the speed limitations, set at 90 km/h by 2020, are incrementally and yearly decreased. The physical space allocated to cars on roads and parking lots is overall significantly reduced.

The access to public transportation national network is charged one euro/person/day. The 10-year transition period witnesses a steep increase in the offer of public transportation, in terms of extension of the network, the passage frequency, and the connection of bus, tram, subway routes, and cycle lanes. This encourages multimodality for everyday commuting. In order to deal with the progressive increase of users, the cities apply peak shaving principles in large cities to manage demand at peak hours, by shifting the starting hours in the morning and encouraging home-working for example.

Besides, collective taxis and car-sharing still provide a sporadic solution for emergency cases, at national subscription prices. The vehicles are electrified and alimented by renewable energy. However, it is absolutely unconceivable to provide each EU citizen with individual electric cars because of the tremendous embedded carbon footprint of their production. Indeed, these highly technological cars are heavy consumers of energy, rare metals, and primary resources. For this reason, even though every neighbourhood has access to shared electric cars, the price remains dissuasive for everyday commuting and is only promoted for singular journeys. The collective taxis offset the lack of alternatives in some regions, help connect isolated residents to the transportation network, and are partially financed by regional collectivities.

The trains, among the most sustainable means of transports (see Figure 5), become key actors of human mobility. The year 2030 is characterised by the reopening of long-distance night trains and train lines serving middle-sized cities, that have historically been progressively abandoned.

Air traveling is highly discouraged, as we need to phase out from the flying sector. Most of the European airports are closed by 2030, due to the immediate abandon of investments and subsidies in national and international airports that occurred in 2020. This measure was complemented by the prohibition of expansion or enlargement of existing infrastructures. By 2030, every passenger leaving or landing in European airport pays a fixed tax, which is incrementally rising. An alternative to this unique tax might be a kerosene taxation system. These stringent financial measures aim at making air traveling non-competitive for flights covering distances lower than 3000 kilometres, compared to trains. This leads to the end of aviation for short-term stays abroad (city trips, business trips). Long-term traveling experiences are still possible through a lottery of intercontinental tickets for traveling for more than 6 months abroad. Only a pre-selected number of tickets, consistent with the remaining carbon budget, are randomly and yearly distributed for pre-registered EU citizens on the lottery. Tickets are strictly nominative, to avoid the development of an

informal market around it. An average EU citizen has twice the opportunity in his life to take one of these intercontinental flights.

However, transcontinental journeys are also available and facilitated in the sea travel sector by 2030. For near-term, cargos are still authorised to circulate across the world and provide access to individual seats onboard. The passengers on these cruises are progressively being taxed, to engage the transition towards a wind energy-driven sea transportation. In the long term, the practice of sailing is generalised and recognised as the primary mean of long-distance transportation, free of any taxation.

### **3.10 Fret transport**

The fret transportation situation of 2030 can be summarised by a consequent cut of goods transport, an overall reduction of the distance travelled by goods, and the systematic implementation of low carbon intensity means of transportation. The sector of production has shifted the emphasis from specialisation and globalisation, that require to massively export products with subsidised tariffs worldwide, to a re-localised system aiming at producing goods in order to meet the needs of a geographically determined community.

In a broader sense, a country exporting goods must receive a permit from the EU Commission after being reviewed as a neutral actor. This legal authorisation also determines what volume should stay on the national territory in order to avoid the need for importations of a comparable product. In terms of importing goods, a prerequisite analysis of the products ensures that the importations do not lead to an unfair competition with potential local production. The analysis also provides an estimation of the acceptable volumes which enter the European or national territory. Therefore, the main goal is to prioritise the local project developers, by capping imports through adaptable and renewable quotas delivered for one year. The protectionism of local production actors implies their commitment to balance the market prices as reasonable. In case of disrespect of these agreements, producers take the risks to see the national borders become more permeable for the importation of similar products.

The practical consequences of the legislative shift regarding industrial production affect many various aspects of fret transport. The prices of all types of fuels for road transportation are, monthly and incrementally, increased and thermic trucks are banned from the use of public roads. The State imposes high taxation of negative externalities through an

international environmental VAT, and undertakes a process of massive subsidisation of the multimodal network through train and wind-powered water fret transport.

The national fret transportation, and more specifically the ridership growth in urban environments, necessitates a meticulous organisation. Indeed, as the circulation of cars and trucks in cities is highly discouraged, food and material products are dropped in the surroundings of the cities. The ridership is completed by a delivery system intra-city by ecological means of transportation, such as electric vehicles through facilitated delivering axes. Goods delivery becomes a public service, decreasing the need for individual car use and encouraging the participation of co-workers as a professional activity or community work. A consequent logistic work is required in the storage infrastructures to articulate the food chain between producers and consumers. The sector of car and road transportation industry has suffered from loss of employment, but workers were redirected and accompanied in the process of change towards other sectors, such as soft mobility. Parallely, the massive re-opening of long-distance sailing and railing fret transportation roads now provides opportunities to couple fret transportation with human mobility.

### **3.11 Consumerism and service sector**

In terms of goods consumption, 2030 is the decade of the generalisation of goods rental and subscriptions to objects libraries, cultural, and media libraries. The consumers have now the common sense to see the incoherence of buying objects that are used less than 10 times a year and that can easily be shared. A textile and wool bundle per inhabitant allow citizens to create their items, revolutionising the fashion industry. All the goods that remain to be bought are guaranteed for a lifetime by producers, regulated by stringent legislations. The legislative pressure also gives the right to all to have access to spare parts, plans, tutorials and direct professional services of assistance to repair broken goods. Meanwhile, the generalisation of collective workshops gives citizens the opportunity to produce sustainable goods from renewable, circular resources or recycled materials with professionals.

### **3.12 Waste collection system**

The waste collection system holds a significantly-decreased important position in the 2030 scenario of the society. One of the indirect major drivers of past over-consumption was the easiness citizens have to get rid of their trash or undesired items. At the beginning of the 20<sup>th</sup> century, EU citizens used to dispense conveniently and rapidly of any type of products.

This convenience of waste collection system was preventing the users to perceive the importance of the upstream basic steps to be taken: refuse, reduce, reuse, recycle and rot. By 2030, the amount of household waste has been drastically reduced. Widespread and stringent laws on plastic packaging and processed food lead to the valorisation of bulk food. This has an impact on the composition of household garbage, which is now largely dominated by organic waste. A decentralised and efficient organic waste collection system for composting promotes the circularity of essential nutrients and the upscaling of waste. This local approach is driven by the need for compost for urban agriculture and market gardening purposes.

### **3.13 Media, advertising, publicity**

In the past, the liberalisation of the market has led to the use of media channels to trigger the desire to purchase of potential consumers, namely all of us. The mediatic system was partially responsible for driving the fast-pace consumption phenomenon of society. A 2030 scenario of society which is centred around healthy time management and sobriety rather than short-term never satiated pleasures of consumption, is not compatible anymore with the advertising materials and sales. The freedom of the press remains untouched in terms of expression of opinions, thoughts, and values. However, advertisement can easily be considered as indirect restrictions of freedom of critical choice and is consequently restricted. Indeed, advertising campaigns shape our desires and our perceptions of the material world prioritising economic rationality rather than objective human needs. In such conditions, only low-carbon intensity goods can be advertised to a certain extent, through the channels of press, television, radio.

The importance of and the time spent on social media has drastically decreased, as citizens dedicate more energy to real-life human relationships. The void of human connections, that used to be plugged by distance communication, is now fulfilled by the raised sense of community and belonging to various levels of a group of individuals: family, neighbourhood, community work team, professional environment, district, ... Long-distance communication is promoted as a useful tool to communicate and exchange with human beings from other cultures, mindsets and personal histories, for educational and individual development purposes.



### **3.14 Education and life-long formation**

Education is free for everyone until 25 years old, and national borders are open to allow students to study, specialise and live in the most-adapted university, in their home country or abroad. The education services are of high quality everywhere thanks to State subsidies. Education is perceived as a core aspect of society, and every citizen has equal access to it regardless of their income, family situation, gender, origin. Furthermore, all citizens older than 25 years old can benefit from an annual right of two weeks of formation in any kind of sector. These formations are mainly directed towards manual work and useful skills to be developed in order to increase resilience and independence for private and personal usage, such as gardening, carpentry, sewing, but also artistic and cultural learning. Prices of such formation are capped by the public intervention to be affordable for all citizens.

### **3.15 Healthcare and lifespan**

The lifespan of the average European citizen has been rising constantly and linearly for the last six decades, to reach 80 years old by 2020. The transition period from 2020 to 2030 is marked by a slight decrease in life expectancy. Since the medical system is highly technocratic and carbon-intensive, it appears obvious to prioritise healthcare for young individuals. However, life in 2030 society is much more fulfilling and meaningful. Indeed, time dedicated to professional life is drastically reduced, allocating more free time for aside activities, that gives meaning in people's lives, such as family and friends' relationships, outdoor, musical and cultural activities.

Healthcare is 100% paid back by the State for everyone until 65 years old. Alternatives to our western medical system are promoted, in terms of services to prevent physical problems to occur. For example, alternative medicine, osteopathy, acupuncture, massages, dietary evaluations represent services that have the potential to lead to a diminished consumption of care and medicines, as well as widespread welfare.

### **3.16 Governance, politics and active democracy**

The renovated form of our democratic system is direct, active, locally contextualised and integrative. Instead of voting every few years for people representing us for all the necessary decisions for the duration of their mandate, citizens elect yearly representatives and are involved through referendum in sporadic major decision-making processes that are estimated to have a prominent impact on the lifestyle and our common future. The use of

referendum gives a chance to hear everyone's voice and to confront regularly civil society to new ideas, beyond its electoral choice. Citizens are required to have a short introduction to the topic of the referendum before being allowed to participate in the voting process, as they need to understand the various actors and problematics at stake. The introductory lecture is followed by a short test ensuring citizens' in-depth understanding of the problem to guarantee a decision made for the common good. Citizens are less reluctant to take part in this time-consuming referendum and voting process, considering their amount of free time.

The locally elected governments are involved in the implementation of larger-level government, through second-round selection processes, and so on until large-scale governmental institutions. This bottom-up process of election of wider-scale governance structure promotes the reinforcement of democracy, and ensures a more transparent decision-making process. Indeed, the lower governance levels have a direct responsibility in articulating citizens' desires to the larger structure and keep an eye on decisions made at a higher hierarchical level. Overall, smaller-scale governance institutions have gained much more legislative power in terms of their ability to reform, implement new measures and adapt locally the legal system. This system promotes direct democracy and encourages citizens to take their vote. The share of non-voters has drastically been reduced as citizens feel that their voice has the potential to have a local and short-term impact on their conditions of living. They feel empowered and responsible for their community and this localised electing process reinforces the sense of citizenship and collective responsibility.

Politician is not a lifetime job anymore. Political representatives are EU citizens that choose to dedicate one or several years of their life to decision-making for the greater good. They are therefore highly connected to the ground realities of each locality and not mentally constrained by decades of frustrating experiences. A higher turnover rate guarantees to give a chance of being involved in governance to a wider share of society, to call into question and renew ideas, pillars, and rigid institutions, as well as to critically re-evaluate any aspect of society. Nevertheless, the attempt to become part of a government as some prerequisites: potential political actors must follow a one-year formation to gain consciousness on various implications of governmental responsibilities and constraints. They need to have at least a 1-year experience in a smaller-scale governmental level to be elected at the above level. There is a minimum age (16 years old) and maximum age (60 years old) to become a political representative. People "in power" can make maximum mandates of 10 years of re-election, with some interruption in-between to allow other opinions to emerge and being expressed. The democratic system promotes ethical, age and cultural diversity and imposes a perfect

gender equality. Young people are highly encouraged to take part in the political process that will determine the future they live in.

## 4. Backcasting approach: the legislative steps in the political implementation and realisation of the vision

### 4.1 Renovate our democracy

The form of government that is officially in place in all European countries is democracy. However, expressing a political view once every few years, voting for parties or politicians rather than for ideals and values, and not being consulted for major decisions regarding the future and the common good of population seem to prevent this political system from approaching its ideals of equality, freedom, and independence. Our democratic system should tend towards a more direct form of democracy, where people decide on policy initiatives directly, through the use of popular referendums<sup>47</sup>. Practically, this system is supposed to require participation, transparency, accountability, cooperation, responsibility, and a minimum level of access to knowledge for every citizen. One of the most critical challenges of the transition to be led will be the process of making citizens involved in the collective project of a societal revolution. However, renovating our democratic political system will require the development of new tools, aiming at giving institutional power more directly to the people. Historical examples of subsystems that made democracy progressed towards direct and equalitarian self-governance have demonstrated the importance of a more serious implication of the population in the political and decision-making processes. However, these past examples also proved the necessity to dissociate climatic policies from private interests of civil society, in order to focus on reaching optimised mitigation and adaptation measures, leading to the evolution of society in the direction of sustainability. Besides, this direct representation drives a process of self-education, raise of awareness and sensitisation on debated points, as well as the start of discussions among citizens beyond linguistic, age and cultural boundaries. Arguments in favour of direct democracy support the idea that the education level of the European population being quite high, a common feeling of frustration and tiredness to feel voiceless in the current representation system has started to rise these last decades.

The voting process should be accessible to younger people, who have so far demonstrated an ability to think in terms of long-term well-being of humankind way more mature than most adults, embedded in certainties, norms and habits that they forget to call

<sup>47</sup> (Marc Depoortere from Conseil federal du développement durable) De Hesselle (2019, Mai-June). Climat: Se mettre à l'oeuvre, là maintenant. *Imagine*, 133, pp. 20-33.

into question. The notion of citizenship needs to involve again participation in a decision-making system which is open to as many people as possible. To practically implement it and to make sure to differentiate the private interests of individuals and the common good, a diverse sample of the population should be responsible for guiding the voting process, presenting objectively the alternatives to their fellow citizens, emphasizing the existence of opposing views and interests. The scale of such “citizens councils” can vary a lot, from neighbourhood to sector and region. People would have more spontaneous desire and time to dedicate to community management, as their decreased workload allows them to think beyond their daily lives requirements and self-centred future.

## 4.2 Implement a fair carbon taxation

Around the world, governments are implementing (or attempting to implement) carbon taxes to curb their rising carbon-equivalent emissions in an effort to mitigate against the urgent threat of climate change<sup>48</sup>. Set into place by governmental policies and enacted by companies and citizens, a carbon tax ideally aims at specifically targeting high emitters whilst offsetting the additional expenses of low-income citizens<sup>49</sup>. However, implementing a tax that balances decreasing carbon-equivalent emissions with social equity is difficult to accomplish<sup>50</sup>, as an important part of social equality is bridging the divide between actors of different classes of civil society, but also geographically between urban and rural dwellers. The recent tension resulting from the citizen’s movement of the Yellow Vests in France has clearly shown that the design of a carbon tax is crucial for meeting sustainability goals without dividing the population or place more burden on rural people, which was the case in France. On the other side, others regions of the world (such as British Columbia) have recently introduced an incremental and highly-progressive carbon tax. Even though the tax

<sup>48</sup> Peet, C., & Harrison, K. (2012). Historical legacies and policy reform: Diverse regional reactions to British Columbia’s carbon tax. *BC Studies*, 173, pp. 95-120.

Tietenberg, T. H. (2013). Reflections—carbon pricing in practice. *Review of Environmental Economics and Policy*, 7(2), pp. 313-329.

Rafaty, R., & Dolphin, G. (2018). Has Carbon Pricing Reduced Aggregate Emissions? Evidence from 25 OECD Countries. Working Paper.

Pretis, F. (2019). Does a carbon tax reduce CO2 emissions? Evidence from British Columbia. University of Victoria, Department of Economics

<sup>49</sup> Metcalf, G. E. (2008). Designing a carbon tax to reduce U.S. greenhouse gas emissions. *NBER Working Paper Series*, 1, pp. 63-83.

<sup>50</sup> Beck, M., Rivers, N., & Yonezawa, H. (2016). A rural myth? Sources and implications of the perceived unfairness of carbon taxes in rural communities. *Ecological Economics*, 124, pp. 124-134.

Tietenberg, T. H. (2013). Reflections—carbon pricing in practice. *Review of Environmental Economics and Policy*, 7(2), pp. 313-329.

has led to environmentally encouraging results whilst at the same time preserving low-income households from an unfair taxation system<sup>51</sup>, its success is so far arguable in the sense that it fails to meet the necessary climate commitments. These two examples demonstrate the importance of social justice when implementing carbon taxation, as well as the necessity to set a taxation rate that is high enough to discourage people from buying carbon-intensive goods in their daily lives. The measure has to be somehow painful since EU citizens need to drastically modify the consumption patterns. However, ecological and social justices should not be opposed.

In the short term, we will not escape the legislative step of carbon tax. We need to make carbon-equivalent emissions expensive<sup>52</sup>. Time is running too short to have the luxury to convince all citizens to take actions driven by self-awareness. In our capitalist system, money is the most powerful and widely exploited tool, and it should, therefore, be used to partially lead the transition. Furthermore, carbon taxation will be necessary to avoid the rebound effect, as money saved from the increase of energetic efficiency should not be invested in high carbon intensity services and goods consumption. However, the use of carbon taxation in the same way as it implemented today has unforgivable repercussions on the notion of social justice. To limit the unfairness of this measure, it should be complemented by other deep revisions of our capitalist system, such as capping wealth and salaries, implementing a lottery system for the access of the population to limited activities, or setting a limitation for maximum individual ownership of resources.

On the long term, the final goal should be the complete decarbonisation, in order to make intermediary low-intensity investments competitive<sup>53</sup>. Therefore, the benefices generated by carbon taxes should be reinjected into climate mitigation (and adaptation) measures, and the development of alternatives to current high carbon intensity services. Moreover, this carbon tax should not only be applied on internal consumption flows, but also on all the inflows to and from European Union, as the long-term objective is a relocation of goods chain and services, as well as the valorisation of locally produced and low-carbon intensity products. Parallely, questioning our dependence on international trade appears as an inevitable outcome.

<sup>51</sup> Murray, B., & Rivers, N. (2015). British Columbia's revenue-neutral carbon tax: A review of the latest "grand experiment" in environmental policy. *Energy Policy*, 86, pp. 674-683.

<sup>52</sup> (Etienne Zaccai from ULB) De Hesselle (2019, Mai-June). Climat: Se mettre à l'oeuvre, là maintenant. *Imagine*, 133, pp. 20-33.

<sup>53</sup> (Vincent van Steenberghe from SPF Environment) De Hesselle (2019, Mai-June). Climat: Se mettre à l'oeuvre, là maintenant. *Imagine*, 133, pp. 20-33.

### 4.3 Control market globalisation

The non-inclusion of indirect carbon-equivalent emissions in the European carbon footprint is one of the most hypocritical falsehoods of our times. The responsibility of European lifestyles in international carbon footprint, pressure on ecosystems, pollution and waste production in developing countries is unforgivable, and we do not even recognise our accountability. However, more than a recognition issue, the consideration of indirect emissions matters in terms of redistribution<sup>54</sup>. Our European tremendous financial means and resources should be dedicated to foster environmentally-conscious behaviours in other geographical contexts which are instead currently being exploited to meet the requirements of our luxurious standards of living. According to the European Commission<sup>55</sup>, European imports and consumption have been responsible for a deforested land area of around 10 million hectares abroad between 1990 and 2008, representing approximately the whole surface of Europe. This embodied deforestation is associated with the production of a good or commodity, that is traded and consumed in Europe. It is mainly driven by our needs of wood, soya (primarily consumed by our European livestock), beef, cacao, palm oil, coffee, rubber.

Even though the World Bank<sup>56</sup> argues that the average European direct carbon footprint has been slightly decreasing/stable this last decade, it appears that there has been an increase of 30% between 2013 and 2017 of our individual average carbon footprints when considering direct and indirect CO<sub>2</sub>-equivalent emissions<sup>57</sup>. This dissonance is caused by the delocalisation of the most carbon-intensive, energy-consuming and heavy polluting industrial activities to parts of the world where the workforce is cheaper and environmental and human safety policies are less stringent. This relocation of production so far away from the consumption hotspots has also resulted in an increased carbon footprint of the freight transportation sector. We have never been consuming more furniture, clothes, leather, meat, chocolate, candies, coffee in the whole history of humanity. The incentivisation to decrease this consumption will necessitate the implementation of integrated national strategies against imported deforestation, through the taxation of such products, the legal prohibition of their importation, as well as the mandatory transparency of their impacts for consumers, for example through mentions on the packaging. The urgent necessity of these measures is

<sup>54</sup> Fraser, N. (2000). Rethinking Recognition. *New Left Review*, 3, pp.107-120.

<sup>55</sup> European Commission (2019). Report: Comprehensive analysis of the impact of EU consumption on deforestation. Environment, Nature and Biodiversity, Forests.

<sup>56</sup> The World Bank (2019b). CO<sub>2</sub> emissions (metric tons per capita) – European Union.

<sup>57</sup> (Joeri Thijs from Greenpeace) De Hesselle (2019, Mai-June). Climat: Se mettre à l'oeuvre, là maintenant. *Imagine*, 133, pp. 20-33.

especially obvious since trees are the most reliable carbon capture structures we know so far, that our tremendous resources, time and financial investments in research have not overcome. The perennial vegetal world has seen its living organisms adapting to various biomes and ecosystems for the past hundreds of millions of years, and is, therefore, exceptionally resilient, performant and reliable. Besides, this natural carbon capture method does not necessitate further technologic research, investments and risky bet for the future.

#### 4.4 Change and re-localise our agriculture, and readjust our diet

##### **Current situation of European agricultural system: the Common Agricultural Policy**

The sector of agriculture emits approximately 10% of greenhouse gas emissions within the European Union, not counting the undirected emissions of imported soya to feed our livestock<sup>58</sup>. However, food consumption in the EU is responsible for approximately 30% of total GHG emissions<sup>59</sup> (see Figure 3). Moreover, the agricultural sector is currently tarnished by environmental controversies and negative externalities such as erosion, biodiversity loss, nutrient leaching, eutrophication, pollution of soil and water tables<sup>60</sup>.

Economically, European agriculture requires the input of more than 50 billion euros annually in the form of decoupled direct payment and rural development budget in order to remain competitive in the face of international imported products<sup>61</sup>. Historically, the successive price and overproduction crises, combined with the low-profit margins for small-scale family farmers, have led to financial pressure on the EU in order to give its food producers a minimum wage<sup>62</sup>.

Besides, the social status of the 4.2 million farmers in the EU becomes harder and harder to live, and the suicide rate among European farmers is up to 20% higher than that of the general populous<sup>62</sup>. The image of the profession has devalued across time and is one of the most isolated social group. Between 2003 and 2010, a quarter of the EU farms have disappeared, and in 2014, 3% of the largest farms had control over 50% of agricultural lands,

<sup>58</sup> Our world in data (2017). *Emissions from agriculture and land use. Greenhouse gas emissions (CO<sub>2</sub>e) by sector*.

<sup>59</sup> Rööf, E. (2013). *Analyzing the Carbon Footprint of Food: Insights for Consumer Communication (Doctoral Thesis)*. Faculty of Natural Resources and Agricultural Sciences Department of Energy and Technology, Uppsala, Sweden.

<sup>60</sup> Flament, J. (2011). *The CAP towards 2020: what structural policies?*, Brussels, 2011. Belgium: Collectif Stratégies Alimentaires.

<sup>61</sup> Flament, J. & Van Der Steen, D. (2010). *Can the CAP manage without market regulation after 2013?*, Brussels, 2010. Belgium: Collectif Stratégies Alimentaires

<sup>62</sup> de Hessel, L. (January-February 2019). Reinventing farming methods. *Imagine*, 131, pp.18-33.



making the land access more and more difficult for newcomers<sup>62</sup>. The urbanisation phenomenon can be seen as an indicator of the current malaise in our countryside: today, barely a quarter of the European population remains rural<sup>62</sup>. Our exportations on the world market also threaten the peasant agriculture of the global South and their inherited and invaluable ancestral knowledge.

Finally, the political tensions around agricultural crises, trade liberalisation and the harsh living conditions of farmers are palpable, as the demonstrations, media cover and field interviews show it. Governmental current policies are aimed at keeping food prices incredibly low for the European population. Today, food purchases account for 12% of the household budget, whereas it accounted for more than one third 50 years ago<sup>63</sup>.

The current policy system is bound to fail, especially with the increasing demand for integration of environmental and social factors in the legislation. But agriculture is not a sector like all the others. No human being can go without food, not for a single day.

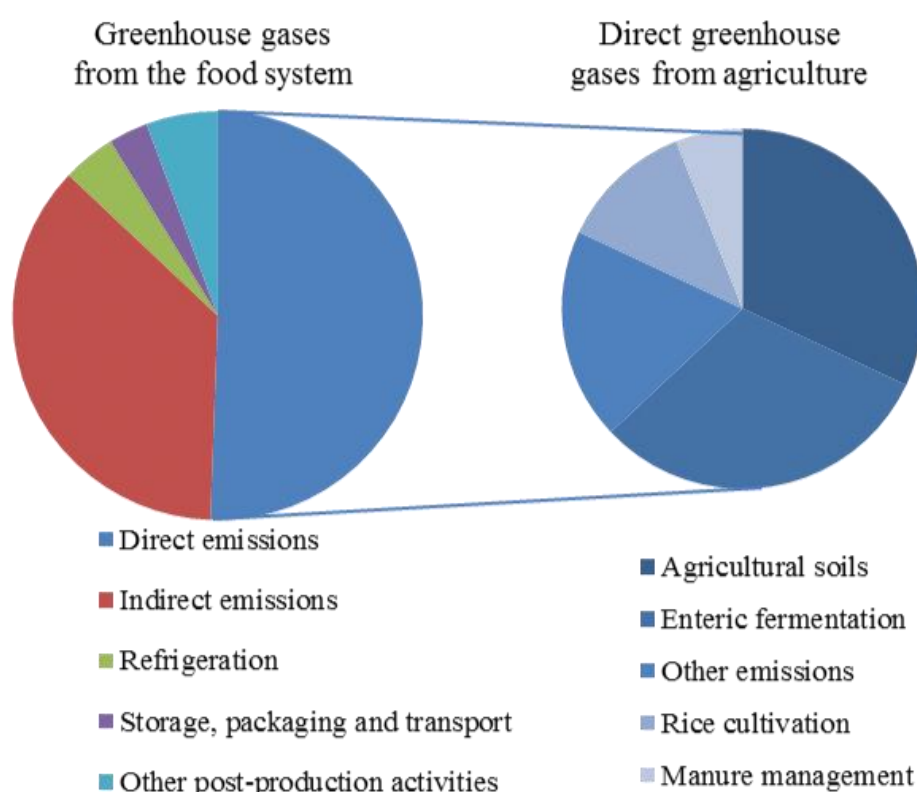


Figure 3: Greenhouse gases emissions from the food system and direct greenhouse gas emissions from agriculture (CCAFS, 2013)<sup>64</sup>. Indirect emissions are caused by deforestation when new agricultural land is taken into production.

<sup>63</sup> de Schutter, O. (2010). *Report of the Special Rapporteur on the Right to Food: final report: the transformative potential of the right to food* (A/HRC/25/57).

<sup>64</sup> <https://www.semanticscholar.org/paper/Analysing-the-Carbon-Footprint-of-Food-Insights-for-Röös/3b72c3ffd07159079563fb6af094d06ed66382b3/figure/0>

### **Near-term adaptation of the Common Agricultural Policy**

In the existing context of a desired transition towards sustainability, agriculture must lead the way for the other sectors. The absolute and ubiquitous necessity of food production for all human beings gives more influential power to agriculture than any other leverage of society. Therefore, the duty of a European Common Agricultural Policy is to serve the greater good, rather than the economic interests of private actors. With this approach, the closing of international financial markets would allow our producers to charge fair prices for their products and consequently, to reduce their dependence on subsidies. The subvention of the CAP could be redirected to support the preservation of small-scale, labour intensive (rather than land and fossil fuel intensive) farming and to sustain financially the transition of agro-industries and the implantation of newcomers. All these reforms should rely on an articulated governance structure that gives a voice to the present voiceless farmers, independently of the size or production of their exploitations.

The current governance system relies on a predominant and almost unique level of policy-making of agriculture, disarticulated from its practical stakeholders. Three leverage points in the governance sphere could be identified to serve the ideal of a sustainable food production system in the future, in terms of environmental impact, social justice, and human health. These three worthwhile areas of investigation are European protectionism and the relocalisation of agriculture, the reorientation of EU subsidies and their major beneficiaries, and the establishment of a more diverse and interrelated network of governance structures.

- **Relocalisation of agriculture and protectionism**

Relocating agriculture in the EU would require a common acknowledgement that Europe cannot win the race towards competitiveness, especially when confronted with areas where agricultural land prices are low, environmental standards (in terms of crop protection products) are not stringent and human and animal welfare is far from being a priority. The current industrial agriculture is oriented towards exportation, and the unfounded dogma of international exchanges as an indicator of national prestige and wealth is a cultural lock-in that needs to be resolved by new policies of trade restriction and import duties and taxes. Globalisation is one of the major indirect drivers of the European agricultural crisis, and it is also responsible for the industrialisation and disappearance of farms in the southern hemisphere. Curbing this phenomenon will necessitate a shift in the attempt of the CAP to integrate European agriculture in the global markets and stringent policies to encourage local relationships between the world of production and consumption. Moreover, the pollution

resulting from those aberrant international exchanges that threaten the sustainability of our agri-food system could be drastically reduced<sup>65</sup>.

- Reorientation of EU subsidies and their major beneficiaries

The current subsidies system could be illustrated by the metaphor of a medical infusion. The artificial input of nutrients or financial revenue is necessary to replace a fair price for food production. Most of the beneficiaries of the subventions do not take it with joy or excitement but have no choice to survive but to accept this unrewarding help. If this infusion was taken away from farmers, some would learn to feed themselves normally again, but others would die. A positive change of policy in the CAP could be the submission of legally enforceable ceilings on farm subsidies. These should remain a financial aid for farmers, not a tool for capital accumulation of property owners. Indeed, even though the first pillar of the CAP intends to decouple subsidies from production, the subventions are proportional to the agricultural land surface and the number of livestock and are therefore intrinsically linked to food production. The allocation of a minimum subvention for small farms (especially the ones smaller than 2 ha that were not eligible for financial support until recently, and the existence of a maximum subvention would deeply reduce the process of enlargement of agricultural farms<sup>66</sup>. Furthermore, this measure would help to focus attention on mid-sized farms which are at the moment too large for diversification but too small for economies of scales. Private subsidies could partially be replaced by productive investments in Cooperatives for the Use of Agricultural Equipment (CUMA), farm shops and markets to promote short-cycle sales, agriculture training centres, exchange groups for techniques and agricultural cooperative for jobs and activities gathering forces and working tools. In other words, these subsidies should actively accompany the transition. Instead of suppressing all of them or keep the policy intact, subvention should encourage farmers to move in the desired direction.

- Establishment of an alternative governance structure

The European Common Agricultural Policy is currently serving the private interests of some business stakeholders, such as the agro-industrial firms and the agrochemical companies. The food production can be seen as a chain constituted of diverse actors. The farmers/producers are the first link of the chain, taking the majority of the economic and health risks and being commonly perceived as major responsible for environmental damage.

<sup>65</sup> de Hessel, L. (January-February 2019). Reinventing farming methods. *Imagine*, 131, pp.18-33.

<sup>66</sup> Flament, J. (2011). The CAP towards 2020: what structural policies?, Brussels, 2011. Belgium: Collectif Stratégies Alimentaires.

The consumers are the last link of the chain, accepting the offer of poor-quality food as long as it remains cheap. In between, the transformation, transport, and packaging companies benefit from the highest economic margins, and organise themselves to create market monopolies and therefore retain control on market prices. The existing governance structure of the CAP has been proved to be susceptible to the corruptive pressure of lobbyists, who take financial advantage of export policies. It is time for a real change and the emergence of a more complex and reliable governance network to support the inclusion of farmers into decision-making. Their organisation in regional collectivities, election of representatives, popular vote or union representation should become an important part of the CAP governance. Furthermore, this bottom-up approach would allow the reinforcement of democracy, re-appropriation of decision-making by citizens, and it would hopefully contribute to reaching incorruptibility<sup>67</sup>.

### **Long-term changes in the nature of the food production system and consumption**

The long-term transition of the agriculture system is probably one of the most critical. We need to rethink its feeding function and mechanisms, and to get away from the industrial system, which is currently a high emitter of azote prodoxid and methane. In that sense, the diversification of agriculture methods through the inclusion of ancestral knowledge inspired from the field of agroforestry and permaculture should lead to a food system relying on less emitting practices and reduced pressures on ecosystems. Indeed, alternative and forgotten food production methods all emphasise the benefits of spatial and temporal rotation and intraspecific and interspecific diversity of crops in the fields<sup>68</sup>. Besides, the legislative measures should provide incentives for food producers to shift towards the use of perennial crops, considering their numerous advantages and positive externalities in terms of erosion, nutrients loss, sensibility to weeds and energy requirement<sup>69</sup>. Furthermore, they represent huge potential leverage in carbon capture, as this nature-based solution is way more reliable than the current uncertain research on highly-technological and context-dependent carbon capture infrastructures<sup>69</sup>.

<sup>67</sup>Flament, J. (2011). The CAP towards 2020: what structural policies?, Brussels, 2011. Belgium: Collectif Stratégies Alimentaires.

<sup>68</sup> de Schutter, O. (2010). *Report of the Special Rapporteur on the Right to Food: final report: the transformative potential of the right to food (A/HRC/25/57)*.

<sup>69</sup> Crews, T. E., Carton, W. & Olsson, L. (2018). Is the future of agriculture perennial? Imperatives and opportunities to reinvent agriculture by shifting from annual monocultures to perennial polycultures. *Global Sustainability*, 1(11), pp. 1-18.

Another set of legislative steps in the food sector should aim at promoting autonomy in the food chain and self-sufficiency in vegetal proteins. Parallely, the reduction of meat consumption, either in terms of the type and quantity of meat, is probably the key leverage point of the transition<sup>70</sup> in the sector of food production. Indeed, the consumption of animal products has the largest effect on the GHG intensity of diet<sup>71</sup> (see Figure 4). Practically, the reduction of the livestock is an absolute prerequisite, as well as the prohibition of soya importation and the taxation of any imported and exported food products in order to make it more profitable for producers to find local markets, and therefore to reduce the pressure of international fret transportation. Currently, production-based emission calculations severely underestimate the GHG footprints of EU diets and the role of trade in its value<sup>71</sup>. Our consumption of the most impacting food products in terms of greenhouse gas emissions has to be drastically reduced through the imposition of financial sanctions following the approach of “polluters pay”.

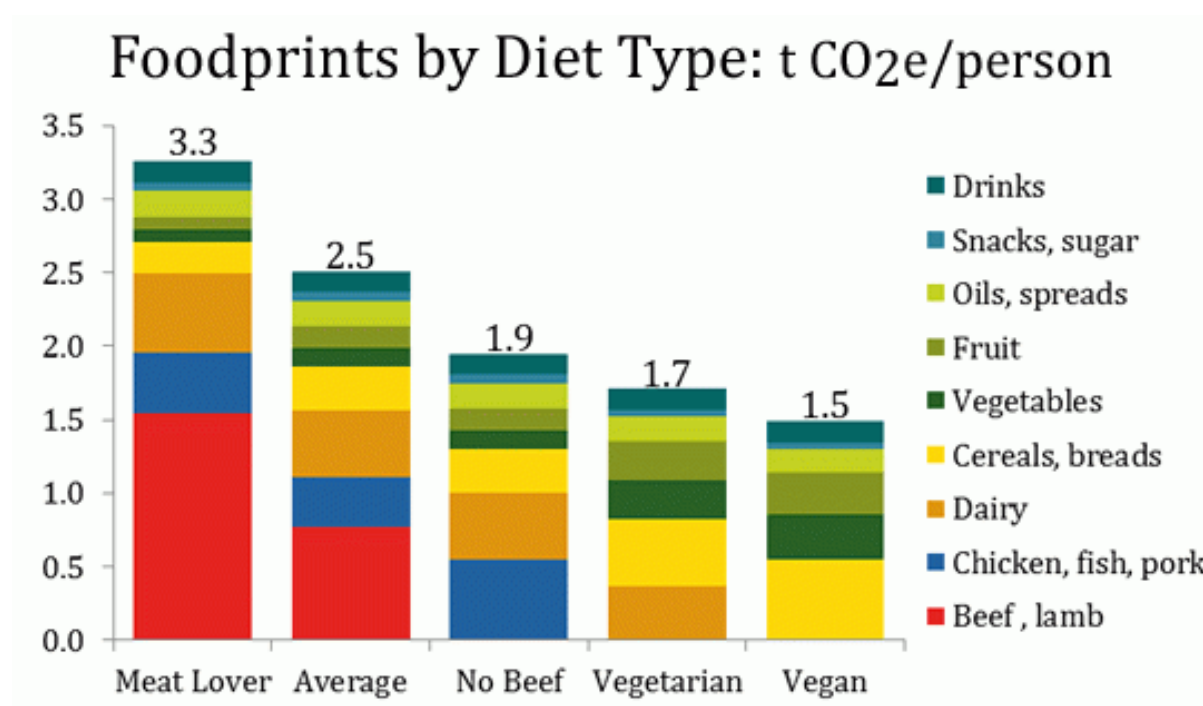


Figure 4: Estimation of food production emissions (including for supply chain losses, consumer waste, and consumption) based on 2,600 kcal of food consumed per day in the US.

(Shrink that footprint, 2015)<sup>72</sup> data from ERS/USDA, various LCA, and EIO-LCA.

<sup>70</sup> (Brigitte Gloire from Oxfam) De Hessel (2019, Mai-June). Climat: Se mettre à l'oeuvre, là maintenant. *Imagine*, 133, pp. 20-33.

Wynes, S. & Nicholas, A. K. (2017). The climate mitigation gap: education and government recommendations miss the most effective individual actions. *Environmental Research Letters*, 12(7).

<sup>71</sup> Sandström, V., Valin, H., Krisztin, T., Havlik, P., Herrero, M. & Katner, T. (2018). The role of trade in the greenhouse gas footprints of EU diets. *Global Food Security*, 19, pp. 48-55.

<sup>72</sup> <https://www.slideshare.net/petermumford2/carbon-footprints-presentationv4>

## 4.5 Change the transportation system (land, air, sea)

### **Near-term adaptation of the internal transportation system**

The mobility sector represents a huge share of the emissions from the European Union. Furthermore, it has a huge impact on the health and well-being of urban dwellers. The core measures to lead a transition are the systematic promotion of a “less attitude”<sup>73</sup>, starting with the shift in our cultural consideration of the car, from the currently dominating actor of our transportation system to a sporadic emergency solution. Newly implemented policies should aim at regulating the automotive market and consequently reducing the availability, the affordability, and the public promotion of car production and use. It appears clear that the transition will be beneficial in the long term to most EU citizens, provided that the discouragement of car dominance is accompanied and supported by an evolution of urban planning and development towards the promotion of soft mobility. For example, the extension of the cycle lanes network has been proven to be highly inefficient if not accompanied by a restrictive regulation of car use<sup>74</sup>. Ultimately, the transition 2020-2030 should deeply modify the structure and dynamics of European cities, that will be constituted of pedestrian neighbourhoods, low-emissions zones, and dominated by binding measures and speed limits. On the other side, car mobility will slowly be shifted towards collective mobility, promoting car-sharing and car-pooling. These electric cars will be made available for sporadic occasions, but under no circumstances will be turned into a daily mean of transportation.

In the short term, the abolishment of company cars is an absolute necessity<sup>74</sup>. The development of alternatives for urban commuters, such as the public transportation system and biking infrastructures, could be financed by the heavy taxation imposed on car circulation. This circulation tax will be deducted from the weight, the occupation rate and the carbon emission intensity of the vehicle. Another tax could be implemented at the entrance of urban zones, to discourage long-distance commuters reliant on car use. Meanwhile, the State needs to legally and financially support the extension of railway networks and the reopening of intermediary stations<sup>75</sup>. The re-intensification of night and international train road use will support the discouragement campaign around flying, and become the main mean of

<sup>73</sup> (Juliette Boulet from Greenpeace) De Hesselle (2019, Mai-June). Climat: Se mettre à l’oeuvre, là maintenant. *Imagine*, 133, pp. 20-33.

<sup>74</sup> Clerbaux, C. (2019, January 4). Personal Interview.

United Nations. (2019). *Goal 11: Make Cities Inclusive, Safe, Resilient and Sustainable*.

WHO (2019). *Background Information on Urban Outdoor Air Pollution*. Public Health, Environmental and Social Determinants of Health (PHE). World Health Organisation

<sup>75</sup> (Francois Sana from CSC) De Hesselle (2019, Mai-June). Climat: Se mettre à l’oeuvre, là maintenant. *Imagine*, 133, pp. 20-33.

transportation for long-distance travels in the EU<sup>76</sup>. The taxes imposed on high carbon intensity transportation means (see Figure 5) will finance the train transportation development, in order to make it competitive with flights at a European scale. As previously mentioned, greater accessibility and wide adoption of soft mobility and train transportation are implementable only if they are parallelly accompanied by discouraging measures and repressive actions against car and plane dominance.

### **Long-term adaptation of the international transportation system**

On the longer-term and wider geographical scale, aviation and maritime transportation will be key sectors in the transition of international fret transport and human mobility. These aspects have so far been conveniently unconsidered in climate agreements and calculations of national carbon footprint. We cannot afford the luxury of not considering these aspects anymore<sup>77</sup>. The current increase in aviation emissions<sup>78</sup> demonstrates the urgency of stringent actions towards this sector's emissions, before its uncontrollable explosion. The first measures to lead the transition should be kerosene taxation on any planes landing or taking off on European territory (whether it be for international or European flights)<sup>79</sup>, as well as an immediate cessation of European airports' construction or extension<sup>80</sup>, and the prohibition of all flights under a distance 1000 kilometres<sup>81</sup>. Meanwhile, legislations have to change regarding the remaining share of maritime fret transportation, which has to be drastically reduced between 2020 and 2030 through the relocalisation of food and goods production. Nowadays, transportation costs of food and material products are extremely low, neglecting the pressures and impacts on ecosystems. In the near-term future, as the price of international

<sup>76</sup> World Bank Data. (2018). *Rail lines (total route-km)*.

Trivector. (2018). The Prospects for developing overnight train traffic in Europe.

<sup>77</sup> (Cédric Chevalier from Urgence Environnement) De Hessel (2019, Mai-June). Climat: Se mettre à l'oeuvre, là maintenant. *Imagine*, 133, pp. 20-33.

<sup>78</sup> World Bank Data. (2014). *CO2 emissions from transport (% of total fuel combustion)*.

Eurostat (2017). Extra-EU-28 transport of passengers in 2016. *Eurostat Air Transport Statistics* European Environment Agency. (November 7, 2016). *CO2 emissions from passenger transport*.

Mason, K.J. (2005). Observations of fundamental changes in the demand for aviation services. *Journal of Air Transport Management*, 11(1), 19-25.

<sup>79</sup> Skatteverket. (n.d.) *Tax on air travel*.

Eurostat (2017). Record number of air passengers carried at almost 1 billion in 2016. *Eurostat News release*, 152

<sup>80</sup> McDonald, S., Oates, J. C., Thyne, M., Timmis, J. A. & Carlile, C. (2015). Flying in the face of environmental concern: why green consumers continue to fly. *Journal of Marketing Management*, 31 (13-14)

<sup>81</sup> Eurostat (2017). Extra-EU-28 transport of passengers in 2016. *Eurostat Air Transport Statistics*.

fret transport rises, it should become competitive for passengers to travel on infrastructures of ocean crossing maritime fret transportation. However, this measure is temporary, as on the longer-term international fret transport and human mobility should be almost integrally reduced to the transportation capacity of sailing ships.

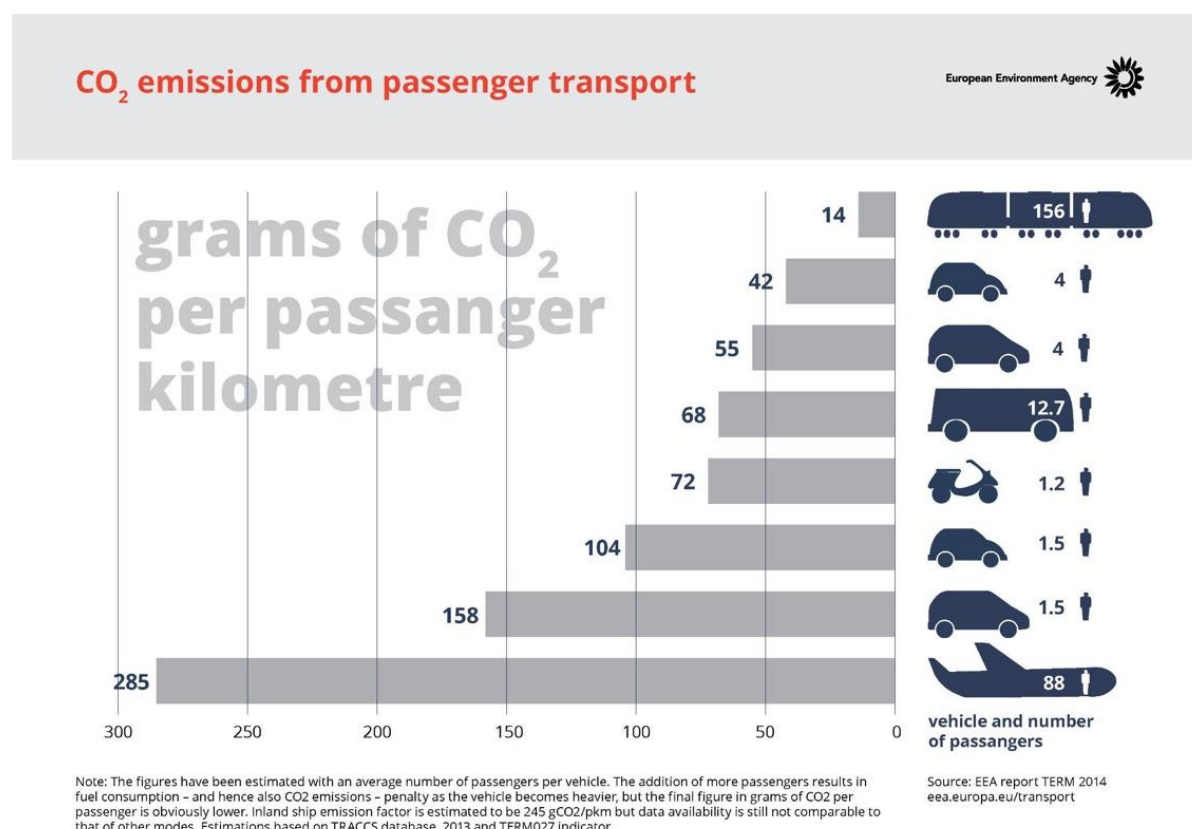


Figure 5: CO<sub>2</sub> emissions from passenger transport. (European Environmental Agency, 2014)<sup>82</sup> Grams of CO<sub>2</sub> per passenger per kilometre for different means of transportation.

#### 4.6 Stop land artificialisation

Between 1985 and 2015, the pace of land artificialisation has been drastically increased in the European Union. However, the spread of concrete, anthropogenic infrastructures and the changes of land-use cannot be reduced to the local geographical context of Europe<sup>83</sup>. Indeed, the extension of the cities through the construction of housing, commercial centres, economic zonings in suburbs, as well as the densification of our road network do not represent the major share of land artificialisation we are responsible for. Our

<sup>82</sup> <https://twitter.com/euenvironment/status/542314833203695616>

<sup>83</sup> (Céline Tellier from Inter-Environment Wallonie) De Hesselle (2019, Mai-June). Climat: Se mettre à l'oeuvre, là maintenant. *Imagine*, 133, pp. 20-33.



consumption model is driving deforestation, intensification of agricultural systems and depletion of resources in the entire world. Therefore, redesigning the policies which regulate our imports and position towards the global market is urgently needed.

On a European level, the native population is not expected to rise in the following decades. However, the consequences of the climate crisis are likely to lead to mass migratory movements from endangered geographical zones to Europe. In order to respond to a potential increase of demographic pressure without relying on the carbon-intensive sector of construction, the densification of housing is our best option<sup>84</sup>. This measure could be led parallelly to the systematic insulation of neighbourhoods. Additionally, beyond a spatial reconsideration of housing repartition, a temporal reorganisation of building use is also necessary, in order to optimise temporary-use spaces, such as schools, offices, ... The reorientation of the taxation system, the legal affordability of housing for citizens (even in urban centres), the rethinking process of sector plan, the reduction of areas of planned urbanisation, as well as the reconsideration of zoning, shopping and collective zones are identified as leverage points to halt land artificialisation in European countries<sup>85</sup>.

#### **4.7 Renovate and adapt our buildings**

Old European buildings are in catastrophic state and urgently need to see their energetic performances highly raised<sup>86</sup>. Therefore, the measure to be taken in priority in the housing sector is a massive energetic renovation in terms of insulative performance. Indeed, 80% of the buildings we will live in by 2050 are already built, we should then focus on renovation rather than construction. Furthermore, this large-scale insulation project will require huge manpower representing local employment opportunities, that could potentially accompany the transition in other sectors which suffer from “environmental dismissal”. The renovation project will be financed by the State, which will shift its financial support in the housing sector towards sustainability. Practically, the buildings will be renovated by neighbourhood or bloc of houses in order to make the process as time-efficient as possible. The mutualisation of renovation costs stimulates housing owners to undertake this work,

<sup>84</sup> (Phillipe Defeyt, from Institut pour un développement durable) De Hesselle (2019, Mai-June). Climat: Se mettre à l’oeuvre, là maintenant. *Imagine*, 133, pp. 20-33.

<sup>85</sup> De Hesselle (2019, Mai-June). Climat: Se mettre à l’oeuvre, là maintenant. *Imagine*, 133, pp.20-33.

<sup>86</sup> (Francois Sana from CSC) De Hesselle (2019, Mai-June). Climat: Se mettre à l’oeuvre, là maintenant. *Imagine*, 133, pp. 20-33.

whereas thermal insulation work on the facades and roofs of low-income and social housing are systematically, and in priority, taken in charge by the State.

#### **4.8 Exercise State control on industries**

Regaining control of the carbon footprint of EU industrial activities, accounting for more than half of all production-based greenhouse gas emissions of the European Union, should be one of our priorities in the following decades<sup>87</sup>. Indeed, we need to redevelop, reimplement and strengthen the norms for production. The tool of legislative power of the State on industries' behaviours has been progressively forgotten for the benefit of free-market mechanisms and taxes. These industries themselves are aware that business-as-usual will not lead humanity in the right direction. As a matter of fact, in 2017, BP and Shell were running internally (without informing their shareholders or the public) their forecasting calculations with assumptions of temperature increase of above 5°C on average by 2050<sup>88</sup>.

Stringent laws need to be developed and enforced in fields such as: packaging being limited to what is strictly necessary, a systematic deposit-return system, the abolishment of advertisement for high carbon intensity goods and services, a legal prohibition of planned obsolescence in all sector, and a lifetime warranty for most products. The State, on behalf of consumers and civil society's common good, has the duty to require durability commitments from its industries. Their products need to be guaranteed for life-long by default, and the replacement of spare parts should become the new current standard.

#### **4.9 Financial and investments system**

Given the stark excess of emissions from current and planned operations of fossil fuel companies today, immediate action needs to be taken to keep enough amounts of fossil fuels in the ground. Isolated investments in renewable energy sector and environmentally friendly companies will not represent a sufficient measure to stay within the world's carbon budget. Indeed, it should be appropriately accompanied and backed up by deep practices of divestment, which means that we need to get rid of our holdings in the fossil fuel sector, or any industry which is heavily relying on its consumption.

<sup>87</sup> Official Journal of the European Union (2010). *Directive 2010/75/EU of the European Parliament and of the Council on industrial emissions (integrated pollution prevention and control)*, L 334/17.

<sup>88</sup> Chapman, B. (2017). BP and Shell planning for catastrophic 5°C global warming despite publicly backing Paris climate agreement. The Independent.

A policy initiative is needed to standardise taxonomy and disclosure requirements for measuring and comparing climate impacts of financial products. This will allow the harmonisation of the reporting of climate-related parameters of any type of investment and their alternatives, and provide accessible and adequate data which systematically lead to consistent comparison of the climate impacts for investors. Such a platform will legally ensure the regulation of disclosure requirements and eco-labelling of financial products and, therefore, align the financial system with the climate objectives. Even though it should primarily rely on the rise of awareness on questionable financial assets of institutional investors, we should not neglect the process of enabling EU citizens to have easy online access to these comparative analyses, to have a diversity of choices, and consequently to take part in the acceleration of the transition towards a low carbon economy.<sup>89</sup>

There is an urgent need for general public concernment and involvement in an integrated and EU-wide initiative mainstreaming green and ethical investment in various fields, such as pension funds, local economy, localised companies, and public services. Indeed, a financial control system will trigger a positive feedback loop of improved practices in terms of transparency and environmental-friendly behaviours. Transparency is central element in carbon pricing schemes leading to the allocation of carbon-equivalent emissions certificates, as well as in the involvement and empowerment of citizens themselves. Overall, financial attractiveness and the expression of public opinions will outperform companies which currently rely heavily on fossil fuel consumption, and which will, therefore, need to adjust their core strategy.<sup>89</sup>

The long-term consequences of such a centralised and public access to investment portfolios will be the generalisation of climate-positive investment behaviours, while short-termism and rent-seeking in finance will be largely discouraged by public attention and State legal framework. Indeed, with the increased likelihood of policy-makers adopting stringent climate policies (such as higher, cross-boundaries and cross-sectoral carbon taxations in the EU), a wide opening up of opportunities for low-carbon industries that need long-term financing is likely to happen. Overall, regulatory enforcement in the field of climate policies on the nature, size, and orientation of financial investments will create incentives for these investments to support structural change.<sup>89</sup>

<sup>89</sup> Accurso, M., Censkowsky, P., Kozakiewicz, J., Lyeteg, E. & Mosley, F. (2019). *Project Proposal: Funds for Future*. EIT Climate-KIC Journey Transalpine

#### **4.10 Coordinate different levels of power and governance**

In order to implement time-efficiently all these legislative steps, we need to involve every group of actors of society. The scientists and academic members should not stay in their laboratories and offices, communicating their findings to the world exclusively through publications in papers for a highly-specific audience. Similarly, the supposedly impartial and neutral approach of scientists should not restrict their scope of actions to eternal criticism of political strategies, but rather promote interactions between public power and science, fostering demand for and participation in concrete responses and real commitments to the environmental crisis at a political level.

The co-existence and coordination of various political levels of power should not be seen as a contradictory target to the transition of EU society towards a common direction, with common European legislative leverages. Indeed, even though the international level of power could set the overall target of “reaching a society with individuals carbon footprints of 2.1 of CO<sub>2</sub>-equivalent/year/person”, the remaining national, regional, and federal levels of power would be responsible for deciphering the measures to be taken. These contextual and adaptive strategies would take into consideration the various geographical, environmental, social, and economic factors that vary depending on the location.

It is apparent that our current governmental institutions are not properly equipped for a common long-term vision of the society, and therefore immature to aim at meeting our international commitments. Furthermore, international cooperation agreements without any legislative sanctions have historically been proven to be politically possible, but inefficient in practice. Without any doubt, the current nature of our political system itself makes it unable to address the climate crisis, as the availability of implementable tools on civil society and the market are limited, short-term oriented and constraint by territorial boundaries. Therefore, the beginning of the transition should promote the constitution of a common framework encouraging better coordination, more transparency and coherence, aiming at developing a multi-level dialogue.

## 5. Conclusion

The climatic and more generally the environmental crisis we live in is an unprecedented opportunity to redefine the social contract between the State and its citizens. The transition towards a new socio-economic model requires the establishment of common, shared and realistic objectives and the expression of the need for radical actions, that can be shared through the spread of a futuristic vision. However, the widespread adoption of such envisioning will require a commitment from the State to restore the social and moral framework in order to provide minimum safety conditions for citizens. Indeed, before starting ambitious climatic policies, we need to care for the living elements of the system that is to be revolutionised, and deal with the fear of human beings concerning a low-carbon future. The maintenance of equity, equality, and meaning in people's life in a fast pace transition requires the creation of a strong cohesion among human actors of civil society, and the implementation of a safety net to reassure EU citizens for the uncertain years to come, as well as their ability to meet their basic needs, which will shift from monetary minimum conditions to tangible variables such as time, space, common goods and services.

The renewed and strengthened trust between policy-making level and its actors, and civil society will be inestimable help in the long term and immediate strategy to meet the EU environmental targets. The opening of this window on deep reforms of society will lead to a collective, systemic, global and multi-facet reflection of EU citizens on the future we want to see realised, and which will necessarily imply constraints for our lifestyles, production and consumption patterns and inner perception of sense in our lives. The definition of normal life, as we perceive it today, has to change, because it cannot be sustained further if we ambition to remain within the planetary boundaries. The actions to be taken will lead to a deep and profound transformation of our society, our referential of values and social contract linking EU citizens in the short run, as we only have one decade ahead to divide our carbon-equivalent emissions by 5.

We need to stop thinking that change does not concern us, that our living standards and wealth protect us from the consequences of inaction. Because it is not and will not be the case. Historically, this passive approach has led to the reinforcement of the subordination link between transition and aging economies, the sacrifice of local autonomy and self-sufficiency to the profit of globalisation and mechanisation, the neglect of the recognition of a huge

share of the world's human population, the accelerated rate of resources exploitation, ecosystems perturbations and biodiversity extinction and yet ... no real hope for our future and the one of our children. After 50 years of inaction, the decarbonisation of our lifestyles needs to be dictated by mathematical realities ( $I = PAT$ ) rather than by weak and inconsistent international agreements, based on consensus stating what is “politically possible”, “practically feasible” and “not damaging our current economic pathway”. The recognition of our responsibility towards other forms of life on this planet and the future generations, as well as the core definition of what being “human” should mean, will give us the courage and the imagination necessary to deeply modify our referential of life.

The future will be radical or will not be.

It is not going to be easy, but that it is going to be worth it.

*“As for the future, your task is not to foresee it, but to enable it.”*

Antoine de Saint Exupéry

## 6. What are the next steps after reading this paper?

The scenario 2030 and the backcasting approach constituted the core of this paper. The vision does, of course, not intend to become a totalitarian model. Instead, it provides an overview of one of the numerous collective pathways that could lead us towards a future that is not yet written. I hope that reading this vision has provided you with hope, sense of empowerment, and determination to use your structural position to implement changes.

However, I have quickly had the conviction that the content of this paper would not be sufficient to allow any reader to make use of it, if it was not accompanied by a methodology on the tool of visioning and its use. I deeply believe in the power of vision to raise support from the civil society and to accompany the environmental policies and restrictions, to a certain extent, of material freedoms.

For that reason, I have complemented the paper with a background and attempt to explain historical EU citizens' reactions to political implementation of environmental measures (see Appendix A), a guide on how to use the tool of visioning (see Appendix B), as well as an overview of what materialistic and consumerist pleasures should be replaced by and human perception of happiness (see Appendix C).

I sincerely hope that you will find the time to read it, in order to be able to spread this vision among ordinary citizens and to use this tool as support of what the future requires you to implement today.

**Besides, I have the intention to write my Master's thesis from January to Mai 2020 on "How Visioning can Contribute to the Mitigation of Environmental Crisis: Psychological Impacts of the Tool on Policy-Makers and Civil Society". I would greatly benefit from any opportunity to discuss or present to an audience the vision and backcasting approach I developed, in order to exchange around this topic and to perceive readers' triggered reactions, perceptions, and thoughts. A potential publication would also immensely contribute to my longer-term project of writing a thesis for the International Master Programme in Environmental Studies and Sustainability Science (Lund University, Sweden).**

## 7. Appendix

### Appendix A: The current reaction to top-down restriction of material freedoms

#### 1. Citizens' movements: a request for change

Recently, the world, and more precisely Europe, has seen a tremendous rise of concerns from citizens urging their governments to take political action on the climate crisis. This tendency is especially apparent considering the growing importance of environmental organisations and social movements, such as Fridays for Future which has gathered more than a million students in the streets (see Appendix E), Extinction Rebellion, and many others. Some new forms of mental health disequilibrium, sicknesses, and depressions, sometimes indirectly leading to suicide waves<sup>90</sup>, have recently emerged in our Western civilisation in response to the threat of climate crisis and uncertain future<sup>91</sup>. European citizens from all population classes, and particularly students, seem to request loudly and legitimately the right to have faith in their future, their ability to live and to raise children.

Furthermore, it seems that the fact that climate change has been created by our current way of living is a widely acknowledged fact, as it can be proven by listening to Greta Thunberg's speeches, interviewing students, adults and even the elderly, reading academic papers<sup>92</sup> and IPCC reports<sup>93</sup>. Most citizens are conscious that we have to change our economic and political system in order to undertake a transition towards a sustainable societal model. Most citizens understand that we need to change our definition of "normal life" and that we will have to adapt our standards of living to guarantee the next generations the right to live. But the change cannot and will not occur if it is exclusively relying on the shoulders of individual citizens, their lifestyle choices, behavioural changes and sense of guilt. At one point, the structures and pillars of society have to be deeply modified to encourage the right behaviours and actions. It is policy-makers and politicians' responsibility to listen to what

<sup>90</sup> Carleton, T. (2017). Crop-damaging temperatures increases suicide rates in India. *PNAS*, 114(33), pp. 8746-8751.

<sup>91</sup> Cunsolo, A. & Ellis, N. R. (2018). Ecological grief as a mental health response to climate change-related loss. *Nature Climate Change*, 8(4), pp. 275-281

<sup>92</sup> Kendall, H. et al (1992). *World scientists' warning to humanity*. Union of Concerned Scientists ; Ripple, W. J. et al (2017). World scientists' warning to humanity: A second notice. *BioScience*, 67(12), pp1026-1028.

<sup>93</sup> IPCC. (2014). Summary for Policymakers. *Climate Change 2014: Mitigation of Climate Change*. Cambridge, United Kingdom and New York, NY, USA: Cambridge University Press.



students, activists, and citizens are asking for, and to prioritise long-term well-being of population over short-term economic growth and political stability.

We, citizens, are conscious that the recognition of climate urgency and the implementation of impactful legislative steps will modify drastically our way of living. We know that we don't have many other options and that the critical next decade during which we bet humanity survival will determine the future of our children. We know that we would not dare to not try our best to solve this climate crisis.

## **2. Collective psychological mechanisms**

The concept of social norms, developed by environmental psychologists, draws from research in social psychology. The premise is that individual thoughts and behaviours cannot be explained only by factors related to individual priorities (such as emotions, values, etc.), but have to be understood in their social context<sup>94</sup>. The concept of social norms can be defined as “rules and standards that are understood by members of a group, and that guide and/or constrain human behaviour without the force of laws”<sup>95</sup>. These norms influence individual behaviour, in the sense that a person's perception of what is socially accepted or not will, to a certain extent, guide their actions<sup>96</sup>. Social norms are therefore useful to understand consumption patterns. However, some scientists<sup>97</sup> criticise an economic view that states that citizens exclusively base their decisions on individual preferences, by describing consumption behaviour as “collectively and normatively derived”. Similarly, when studying which factors influence pro-environmental behaviour, many researchers have argued that social norms are a powerful driver of individual behaviour <sup>97</sup>.

This vision aims at challenging the set of dominant social norms of our existing society by providing the readers with an overview of a completely different socio-economic model, consistent with environmental targets. Therefore, the indirect objective is to share

<sup>94</sup> Sherif, M. (1936). *The psychology of social norms*. Oxford, England: Harper.

<sup>95</sup> Cialdini, R. B. & Trost, M. R. (1998). Social influence: social norms, conformity, and compliance. In D. Gilbert, S. Fiske & G. Lindzey (Eds.), *Handbook of social psychology*, 4th ed., vol. 2, pp. 151-192. Boston, MA: McGraw-Hill.

<sup>96</sup> Keizer, K. & Schultz, P. W. (2013). Social norms and pro-environmental behaviour. In L. Steg, A. E. van den Berg & J. I. M. de Groot (Eds.), *Environmental psychology: an introduction*, pp. 153-163. Chichester: Wiley-Blackwell.

<sup>97</sup> Southerton, D., Warde, A., & Hand, M. (2004). The limited autonomy of the consumer: implications for sustainable consumption. In D. Southerton, H. Chappells, & B. van Vliet (Eds), *Sustainable consumption: the implications of changing infrastructures of provision*, pp. 32-48. Edward Elgar, Cheltenham.

positive images and to create a sense of community and shared responsibility that supports these alternative social norms.

### **3. Individual psychological mechanisms**

In environmental psychology, cognitive dissonance is defined as a mismatch between an individual's beliefs and actions<sup>98</sup>. This concept was developed by the theory of planned behaviour, which intends to understand normative influences, behavioural intentions, individual values, and other psychological factors<sup>99</sup>. Therefore, assuming that awareness is sufficient to induce environmentally conscious and sustainable decisions among citizens is utopian<sup>100</sup>. The involvement of an emotional level of understanding and is a fundamental prerequisite to building a common projection of the future, develop a strategy to contribute positively to this objective and accordingly turn awareness into actions<sup>101</sup>. In other words, the difference between being aware and acting on this awareness can be explained by the concept of cognitive dissonance. The latter is created through existing narratives used by people to justify why they do not act according to their knowledge. This does not imply that providing information is needless, and it might in fact be a necessary precondition for individual change. Therefore, social norms that enable narratives to exist, as described above, should be addressed in order to decrease cognitive dissonance in everyday behaviour and lifestyle choices and promote behavioural change towards sustainability.

### **4. Negative reaction of citizens to climate change legislation: environmental justice at the expense of social justice?**

Despite the widespread and broad-reaching repertoire of actions led by social movements supporting drastic political mitigative responses to climate change, some could argue that an opposing movement is developing meanwhile. Indeed, the Yellow Vests movement was depicted by some media and political parties as driven by a rising common

<sup>98</sup> McDonald, S., Oates, J. C., Thyne, M., Timmis, J. A., & Carlile, C. (2015). Flying in the face of environmental concern: why green consumers continue to fly. *Journal of Marketing Management*, 31(13-14), pp. 1503-1528

<sup>99</sup> Davison, L., Littleford, C., & Ryley, T. (2014). Air travel attitudes and behaviours: The development of environment-based segments. *Air Transport Management*, 36, pp. 13-22. DOI : 10.1016/j.jairtraman.2013.12.007

<sup>100</sup> Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179-211. DOI : 10.1016/0749-5978(91)90020-T

<sup>101</sup> Moser, S. C. (2013). Navigating the political and emotional terrain of adaptation: Community engagement when climate change comes home. In *Successful Adaptation to Climate Change: Linking Science and Policy in a Rapidly Changing World*, pp. 289-305.

feeling of anger and rejection of the carbon tax on fuel. However, the Yellow Vests activists were dominantly raising their voices concerning the issue of unfairness and inequality of consequences of the carbon tax on the different population classes. Indeed, the lower-income class, urban population with no transportation alternatives and suburbs inhabitants were suffering the most from the establishment of the fuel tax, whereas richer parts of the population could afford it, and were statistically less affected by the additional costs of mobility. This recent example is a helpful contributor to the understanding of the pre-conditions, essential elements and potential frictions in the process of a societal transition.

The major outcome of the analysis of what occurred in France last year is the absolute inefficiency of legislative responses using a weak sustainability approach. The latter made the simplistic assumption that making the consumption of a resource more expensive will lead to its linear and immediate decrease. However, it completely failed to consider the existence of and the access to alternatives, the pre-existing social justice issue underlying society and the exacerbation of this feeling of unfairness. However, environmental and social justices do not have to be competing values, if climate change mitigation measures are integrated into a large-scale and long-term process of renovation of our society, its socio-economic paradigm, distribution of resources and decision-making mechanisms.

## Appendix B: The tool of vision to change the mindset

### 1. Psychological implications of this positive form of communication

The current way of communicating about climate change is not effective enough to spark the systemic behavioural change needed to tackle climate change. The current system is dominated by one-way, negative, expert-based communication from media outlets and online communication is fostering polarisation through isolated, compartmentalised news feeds, forums and communities acting as echo chambers of thought.

The doom-and-gloom approach of communication around climate change relying on a factual and one-way flow of knowledge has been proven to be highly inefficient in the last decades. There is scientific proof that facts alone usually don't change opinions<sup>102</sup>. Communicators tend to feel uncomfortable and unsafe when it comes to sharing values and scientific knowledge around this delicate topic. Therefore, the time has come to reconsider the way politicians talk about climate action mitigation to European citizens, in order to foster individual high-impact actions and lifestyle choices to reduce their carbon footprint by growing civic participation and better consumption choices.

Aside from the impact of the vision on policy-makers, European citizens who come across this vision are likely to feel empowered and involved in climate change mitigation discussions and to elicit a new understanding in the other that can then cause changes in behaviour and actions. These conversations will echo in the back of everyone's mind and, through further conversations, create a ripple effect that reaches offices, schools, policy-makers and more, creating systemic change. The tool of visioning has three major assets as a communication method: the use of a positive discourse and non-expert language, as well as the consideration of psychological factors influencing the perception of the information by the audience.

<sup>102</sup> Sunstein, C. R., Bobadilla-Suarez, S., Lazzaro, S. C., & Sharot, T. (2017). How People Update Beliefs about Climate Change: Good News and Bad News. *Cornell Law Review*, 102(6), pp. 1431-1442.

- **Positive Discourse**

The zero-lasting power of fear in the discourse around climate change<sup>103</sup> should encourage the exploration of a more positive, action-oriented approach. Instead of alarming, blaming and criticising, we should provide citizens with empowerment, a sense of community and hope<sup>104</sup>. Story-telling methods and the power of narratives are useful tools to transform distant and dramatic information into the part of a human story, which citizens are more likely to relate to. The need for empowerment and positive discourse rather than blaming and negative discourse is widely acknowledged, such as the potential of utopia in futuristic projections<sup>105</sup>. However, the discourse around our scenarios of future is currently largely dominated by dystopia in mediatic, cultural and scientific communication.

- **Use of non-expert language**

A recurrent limitation of the form of delivery of climate change messages is the academic and specific language used by experts. This leads to a widespread failure to communicate in civic society, simply because knowledge-producers and users do not share the same language<sup>106</sup>. Moreover, we need to turn the climate conversation away from science and to relate to people's daily lives, safety, health, job creation, and shared benefits<sup>107</sup>.

- **Consider the psychological factors and the potential of emotions**

Finally, the process of production of a vision involved extended research of psychological mechanisms, group attitudes, and behaviours, as well as the power of emotions and feelings<sup>108</sup>. The use of visioning opens a window on the potential of emotional reactions to the utopian future, through the unconventional form of message delivering, as well as its eye-opening, creative and thought-provoking content. Emotions have a major influence on

<sup>103</sup> Thompson, J. (2018, April 4). *Let's change the way we talk about climate change*. Retrieved from <https://www.youtube.com/watch?v=oXOu-dezdKo>

<sup>104</sup> O'Neill, S. & Nicholson-Cole, S. (2009). "Fear won't do it": Promoting positive engagement with climate change through visual and iconic representations. *Science Communication*, 30(3), pp. 355-379.

<sup>105</sup> Jacoby, R. (2007). *Picture imperfect: Utopian Thought for an Anti-Utopian Age*. Columbia University Press.

<sup>106</sup> Rayner, T. & Minns, A. (2015). The Challenge of communicating unwelcome climate messages. *Tyndall Centre for Climate Change Research Working Paper*, 162

<sup>107</sup> Jackson, T. (2016). Prosperity without growth: foundations for the economy of tomorrow.

<sup>108</sup> Kenzie, E. (2010). *Eyes on the Stars and Feet on the Ground: Creative tension and the role of affect in promoting action on climate change (Master thesis)*. Lund University Center for Sustainability Studies. Sweden.

human decisions and judgements, trigger behaviours<sup>109</sup>, modify our perception of risks<sup>110</sup> and profoundly affect our political voting process<sup>111</sup>. Therefore, it is essential to consider the psychological and emotion-responding processes of the human brain reception of such information, its defensive mechanisms (cognitive dissonance, confirmation bias, rebound effect) and the way to overcome these barriers. On the other side, some strong emotions might also exploit the energy raised from sadness, anger, and fear and transform it into a willingness to act. To quote Donatella Meadows<sup>112</sup>, one of the authors of *Limits to Growth* produced by the Club of Rome: “With half-suppressed anger, I tend to swing out and do something impetuous and ignorant. But a fully felt, grounded, familiar anger can move me through a lifetime commitment to make things better.”

Scholars have been aware of the limits to growth for decades, and scientists keep ringing alarm bells in all parts of the world. The communication gap and the disconnect between science and society, between knowledge and action, seem to prevent massive measures and actions to be implemented<sup>113</sup>. Indeed, scholars and communicators of climate change science are asked to deliver a neutral and dispassionate transfer of knowledge, often leading to an underestimation of the extent of the catastrophe<sup>114</sup>, to policy-makers or civil society, for the sake of “objectivity of science”<sup>115</sup>. However, it is argued that the missing articulation in communication between different actors of society is the involvement and expression of emotions and humanity<sup>116</sup>. Only a few forms of communication of climate change mitigation and societal transition fully make use of the deep emotional solicitations of

<sup>109</sup> Levine, D. S. & Leven, S. J. (2014). *Motivation, Emotion and Goal Direction in Neural Networks*. Psychology Press.

<sup>110</sup> Stanovich, K. E. & West, R. F. (2008). On the Relative Independence of Thinking Biases and Cognitive Ability. *Journal of Personality and Social Psychology*, 94(4), pp. 672-695.

<sup>111</sup> Lu, H. & Schuldt, J. P. (2008). Exploring the role of incidental emotions in support for climate change policy. *Climatic Change*, 131(4), pp. 719-726.

<sup>112</sup> Meadows, D. H., Meadows, D. L., Randers, J. & Behrens, W. W. (1972). *The Limits to Growth: a report for the club of Rome's project on the predicament of mankind*. Universe Books, New York, United States of America.

<sup>113</sup> Marshall, G. (2014). *After the floods. Communicating climate change around extreme weather*. Climate Outreach Information Network.

<sup>114</sup> Brysse, K., Oreskes, N., O'Reilly, J. & McGregor, H. V. (2012). Climate change prediction: Erring on the side of least drama?. *Global Environmental Change*, 23(1), pp. 327-337.

<sup>115</sup> Head, L. & Harada, T. (2017). Keeping the heart a long way from the brain: The emotional labour of climate scientists. *Emotion, Space, and Society*, 24, pp. 34-41.

<sup>116</sup> Farbotko, C. & McGregor, H. V. (2010). Copenhagen , climate science and the emotional geographies of climate change. *Australian Geographer*, 41(2), pp. 159-166 ; Roeser, S. (2012). Risk communication, public engagement, and climate change: A role for emotions. *Risk Analysis*, 23(6), pp. 1033-1040 ; Smith, N. & Leiserowitz, A. (2014). The role of emotions in global warming policy support and opposition. *Risk Analysis*, 34(5), pp. 937-948.

such narratives, and utopian vision is one of them<sup>117</sup>. The vision not only raises the question of what we might do in the future but further who we might be at that time.

## **2. The potential impact of the tool: a sense of community, inclusion, and meaning**

The tool of visioning opens a window of consideration for new ways of relating to each other, producing, consuming, finding meaning in our lives<sup>118</sup>. It provides an opportunity to think outside the strong, dominant discourse, to envision a new way of living and practices. Today, it has become easier to imagine the end of the world than the end of our socio-economic system of capitalism and individualism<sup>119</sup>.

The importance of development of visions and scenarios arises from the necessity to open our minds to the idea of several futures<sup>120</sup>. There is not one universal cone, but a myriad of socially constructed cones (see Figure 6), that must be considered as dynamic because of sciences, experiences and evolving understanding of our environment. The future is open and possible to shape<sup>121</sup>. Future studies will certainly alter human expectations and the components of the vision<sup>122</sup>, but the process of being guided at a policy-making level by an ideal shared with citizens will articulate civil society with governmental institutions. It is precisely this openness of futures that makes us responsible for the actions and the non-actions of today. However, the future is open but not empty. It has been colonised by past and present decisions and lack of actions. Therefore, we must integrate into our scenario the idea of a carbon budget, the 1.5°C degree target, and accept these planetary boundaries as bounds to our imagination (see Figure 7).

<sup>117</sup> Hamilton, C. (2013). *Requiem pour l'espèce humaine: Faire face à la réalité du changement climatique*. Presses de Science Politiques

<sup>118</sup> Plumwood, V. (2007). A review of Deborah Bird Rose's Reports from a wild country: Ethics of decolonisation. *Australian Humanities Review*, 42, pp. 1-4.

<sup>119</sup> Jameson, F. (2005). *Archaeologies of the Future: The Desire Called Utopia and Other Science Fictions*. Verso. London. United Kingdom.

<sup>120</sup> Candy, S. (2010). *The Futures of Everyday Life: Politics and the Design of Experiential Scenarios (Doctoral Thesis)*. University of Hawai'i at Manoa.

<sup>121</sup> Bell, W. & Olick J. K. (1989). An Epistemology for the Futures Field: Problems and Possibilities of Prediction. *Futures*, 21(2), pp. 115-135 ; Karlsen, J. E., Overland, E. F. & Karlsen H. (2010). Sociological contribution to futures' theory building. *Foresight*, 12(3), pp. 59-72.

<sup>122</sup> Robinson, R. B. & Pearce, A. J. (1988). Planned patterns of strategic behavior and their relationship to business-unit performance. *Strategic Management Journal*, 9(1).

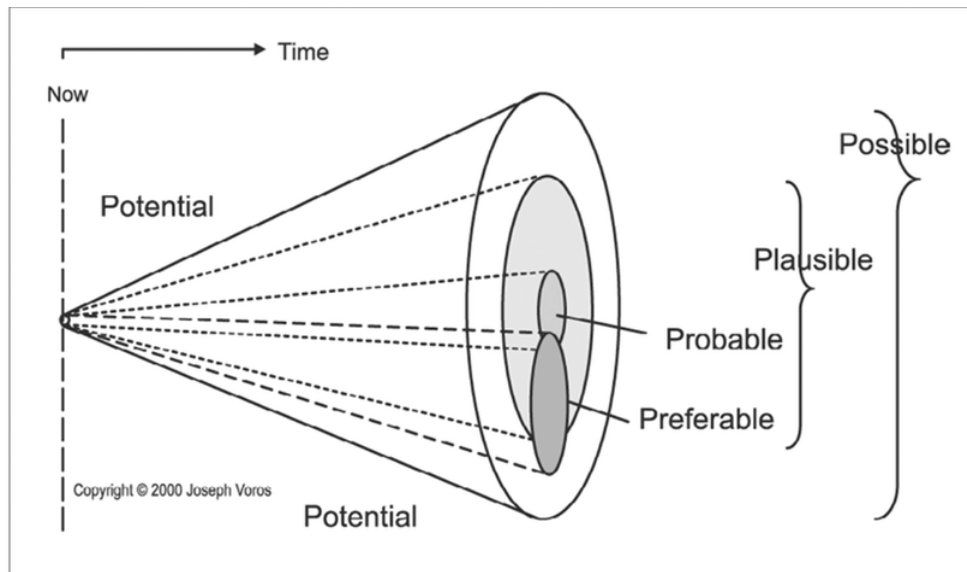


Figure 6: The “Futures Cone”: A generic foresight process framework. (Voros, 2003)<sup>123</sup>, based on (Hancock and Bezold, 1994). Potential: Everything beyond the present moment. Possible: Future knowledge “might happen”. Plausible: Current knowledge “could happen”. Probable: Current trends “likely to happen”. Preferable: Desired future “wanted to happen”.

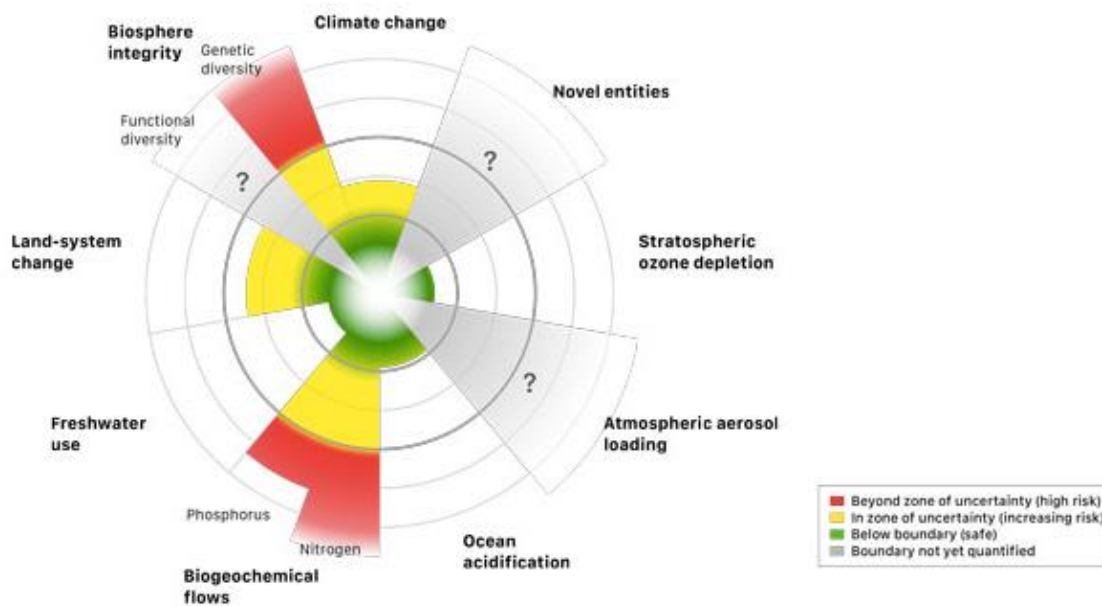


Figure 7: The nine planetary boundaries. (Steffen et al, 2015)<sup>124</sup>. Estimates of how the different control variables for seven planetary boundaries have changed from 1950 to present. The green shaded polygon represents the safe operating space

<sup>123</sup> [http://www.churchfutures.com/documents/Is\\_the\\_Future\\_Predetermined.pdf](http://www.churchfutures.com/documents/Is_the_Future_Predetermined.pdf)

<sup>124</sup> <https://www.stockholmresilience.org/research/planetary-boundaries/planetary-boundaries/about-the-research/the-nine-planetary-boundaries.html>



As Hollinger<sup>125</sup> mentioned it: ‘the telling of new stories so as to inscribe into the picture of reality characters and events and resolutions that were previously, invisible, untold, unspoken (and so unthinkable, unimaginable, “impossible”)’.

We need to unlearn things that we have been taking for granted for decades, such as economic growth, unlimited consumerism and material freedoms beyond what is reasonable, while citizens start to relearn and appreciate alternative futures. The unlearning process corresponds to the de-naturalisation of social norms, that we don’t recognise as such or attribute value to anymore<sup>126</sup>. In parallel, citizens would re-politicise their everyday life actions<sup>127</sup>. The intensification of possibilities provides citizens with a sense of empowerment, as they have the potential with others and networks of human beings to influence the future<sup>128</sup>. This fosters their consideration for a sense of community, integrative attitude and searches for meaning in their human relationships.

### 3. The pitfalls of the tool of vision

However, as useful as visioning is, we shall not fall into the trap of engaging in utopian, homogenous, detached and generalist futures. What we urgently need to activate today is a sort of thinking that commits to an intimate, situated and experiential future<sup>129</sup>, in order to resist the probable “fighting any interpretation subscribing to irresistible nature of unbounded capitalism as if were our immutable destiny”<sup>130</sup>. This vision becomes reality-rooted when it is accompanied by the intensification of perception of various possibilities, the maximisation of frictions with the present, and the wise evocation and inclusion of, but certainly not focus on, a bleak dystopian future. Haraway’s claimed it: “staying with the trouble requires learning to be truly present, not as a vanishing pivot between awful or Edenic

<sup>125</sup> Hollinger, V. (2003). Feminist Theory and Science Fiction”. In: *The Cambridge Companion to Science Fiction*. Eds: Edward James, Farah Mendlesohn. Cambridge University Press: Cambridge.

<sup>126</sup> Eckstein, C. (2004). The measurement and recognition of intangible assets: Then and now. *Accounting Forum*, 28(2), pp. 139–158.

<sup>127</sup> Glyn, W. (2004). Towards a Re-politicisation of Participatory Development: political capabilities and spaces of empowerment. In *From Tyranny to Transformation? Exploring new approaches to participation*, Edited by: Hickey, S. and Mohan, G. London: Zed Books.

<sup>128</sup> Debaise, D. & Stengers, I. (2017). The Insistence of Possibles: Towards a Speculative Pragmatism. *Multitudes*, 4(65), pp. 82-89.

<sup>129</sup> Wangel, J., Hesselgren, M., Eriksson, E., Brom, L., Kanulf, G., & Ljunggren, A. (2019) ; Vitiden: Transforming a policy-orienting scenario to a practice-oriented energy fiction. *Futures*, 112 (1) ; Candy, S. (2010). *The Futures of Everyday Life: Politics and the Design of Experiential Scenarios (Doctoral Thesis)*. University of Hawai’i at Manoa.

<sup>130</sup> Debaise, D. & Stengers, I. (2017). The Insistence of Possibles: Towards a Speculative Pragmatism. *Multitudes*, 4(65), pp. 82-89.

pasts and apocalyptic or salvific futures, but as mortal critters entwined in myriad unfinished configurations of places, times, matters, meanings”<sup>131</sup>.

Furthermore, most visions are not designed to create frictions in the present time, do not relate to a specific group of actors of society, and are kept as the fantasy of a group of researchers, safe from public opinions. There is a risk that unaddressed visions remain images of the futures on a written document, without confronting it to the perception of citizens, or even further, to the real implementation level. We shall not forget that even though vision is a tool of abstraction, it should be used to orient practically actions and decisions, to raise urgent collective action, and to lead to the re-politicising and the opening of our future. The articulation of the level of visioning and taking actions and measures is, therefore, the challenge of tomorrow, as reminded by Jacoby: "The choice we have is not between reasonable proposals and an unreasonable utopianism. Utopian thinking does not undermine or discount real reforms. Indeed, it is almost the opposite: practical reforms depend on utopian dreaming."<sup>132</sup>

<sup>131</sup> Haraway, D. J. (2016). *Staying with the Trouble: Making Kin in the Chthulucene*. Duke University Press.

<sup>132</sup> Jacoby, R. (2013). *Picture Imperfect.: Utopian Thought for an Anti-Utopian Age*. Columbia University Press

## Appendix C: The perception of happiness

Many studies on happiness and materialism come to a common conclusion: stuff doesn't make us happy, neither it gives us the feeling of living a meaningful life.

The driver of this eternal frustration is that our human minds do not think in absolute terms, but rather in relative terms. As soon as the initial excitement of material acquisition is gone, possession and accumulation of objects do not have a long-term effect on our level of happiness. This observed tendency is known as the phenomenon of hedonic adaptation: our reference point adjusts to both positive and negative events or life changes. This means that our expectations and desires rise in tandem with our ability to have access to and afford them, resulting in a net-zero gain of happiness<sup>133</sup>. Moreover, studies demonstrated that the stronger your financial goal, the lower your life satisfaction and family life quality. This is especially true when your income is at the lower end of the wage scale, because the frustrating gap, the feeling of unfairness and the relative comparison to other classes of society prevent human beings from focusing on their own basic needs and desires<sup>134</sup>.

Furthermore, the fractions of the population experiencing happiness and absence of stress in their life according to their annual income seem to reach a plateau when their basic needs are met, such as food security, access to healthcare, education (see Figure 8).

<sup>133</sup> Brickman, P., & Campbell, D. T. (1971). Hedonic Relativism and Planning the Good Science. In M. H. Appley (Ed.), *Adaptation Level Theory: A Symposium* (pp. 287-302). New York: Academic Press.

<sup>134</sup> Rickardsson, J. & Mellander, C. (2017). *Absolute vs Relative Income and Life Satisfaction*. CESIS Electronic Working Paper Series, 451; Wilkinson, R. & Pickett, K. (2009). *The Spirit Level: Why Equality is Better for Everyone*. Penguin Books Ltd, United Kingdom.

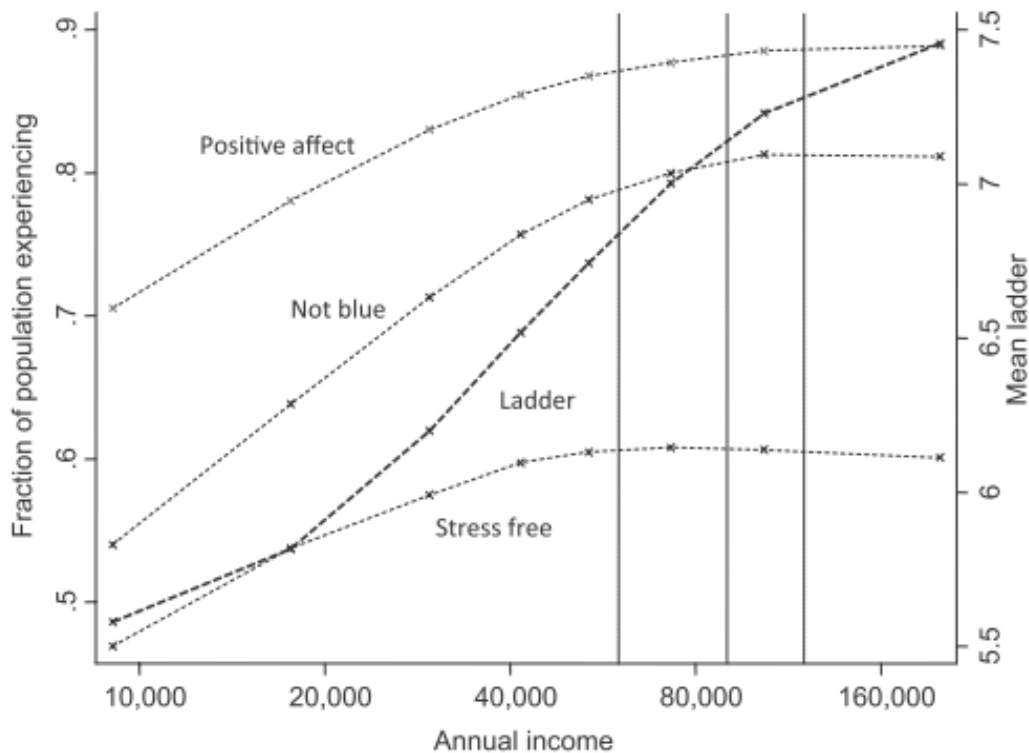


Figure 8: Positive affect, blue affect, stress and life evaluation in relation to household income. (Kahneman, & Deaton, 2010)<sup>135</sup>. Positive affect is the average of the fractions of the population reporting happiness, smiling, and enjoyment. “Not blue” is 1 minus the average of the fractions of the population reporting worry and sadness. “Stress-free” is the fraction of the population who did not report stress for the previous day. These three hedonic measures are marked on the left-hand scale. The ladder is the average reported number on a scale of 0-10, marked on the right-hand scale.

But if the material and financial accomplishment are not conditions for happiness, then what do we need to be happy and find meaning in our lives?

The diversity of drivers of happiness encompasses different activities, attitudes, and inner factors. In terms of external factors, exercise releases hormones impacting our feeling of happiness in the short and long run<sup>136</sup>, lack of sleep has been proven to directly influence our moods<sup>137</sup>, and strong social connections and community that we can rely on play a major role in our happiness level<sup>138</sup>. Other inner factors exclusively depend on our approach of life and

<sup>135</sup> <https://www.pnas.org/content/107/38/16489/tab-figures-data>

<sup>136</sup> Hillman, C. H., Erickson I. K., & Kramer F. A. (2008). Be smart, exercise your heart: exercise effects on brain and cognition. *Nature Reviews Neuroscience*, 9, pp. 58-65.

<sup>137</sup> Dinges, F. D., Pack, F., Williams, K., Gillen, A., K., Powell, W. J., Ott, E. G., (...) Pack, I., A. (1997). Cumulative Sleepiness, Mood Disturbance, and Psychomotor Vigilance Performance Decrements During a Week of Sleep Restricted to 4-5 Hours per Night. *Sleep* 20 (4), pp. 267-277.

<sup>138</sup> Diener, E., & Seligman, M. E. (2002). Very Happy People. *Psychological Science* 13, pp. 81-84.

attitude towards our environment. For example, savouring makes us reliving happy moments<sup>139</sup> and open gratitude to others and ourselves impacts our happiness level<sup>140</sup>. Meditation as a form of mindfulness and awareness of emotional clarity<sup>141</sup>, as well as practicing and benefiting from random acts of kindness in our daily lives<sup>142</sup> also gives additional meaning to our material lives.

It appears obvious that we do not need stuff for all the precedent factors of happiness. However, our current capitalist system is promoting the idea of “happiness through extreme consumerism”. So, what does life look like when our happiness is not dictated by the purchase of material goods? The scenario 2030 depicts one potential future of a society that would provide meaning in our lives through inner transformation and human bounds.

<sup>139</sup> Lyubomirsky, S., Sousa, L., & Dickerhoof, R. (2006). The costs and benefits of writing, talking, and thinking about life's triumphs and defeats. *Journal of Personality and Social Psychology*, 90(4), 692-708.

<sup>140</sup> Emmons, R. A., McCullough, M. E., & Tsang, J.-A. (2003). The assessment of gratitude. In S. J. Lopez & C. R. Snyder (Eds.), *Positive psychological assessment: A handbook of models and measures*, pp. 327-341. Washington, DC, US: American Psychological Association.

<sup>141</sup> Killingsworth, A., M. & Gilbert, T., D. (2010). A wandering mind is an unhappy mind. *Science*, 330(6006), pp. 932-951. DOI: 10.1126/science.1192439.

<sup>142</sup> Otake, K., Shimai, S., Tanaka-Matsumi, J., Otsui, K., & Fredrickson, L.,B. (2006). Happy People Become Happier through Kindness: A Counting Kindnesses Intervention. *Journal of Happiness Studies*, 7(3), pp. 361-375.

## **Appendix D: Relevance of this paper to Sustainability Science**

The vision itself is not only adding to environmental measures that are currently insufficient, but it rather defines an entirely new socio-economic paradigm that articulates environmental and technical strategies with social, cultural, educational political and economic transitions.

Moreover, this transdisciplinary approach does not keep this vision restricted to greenhouse gas emission cuts, energy production, and technical improvements in industrial efficiency. As a matter of fact, this will not be sufficient<sup>143</sup>. Our best chance to mitigate climate change effects lies in an integrated and Europe-wide vision of societal transformation, taking into consideration individual consumption, time management, and wealth distribution, and based overall on the redefinition of meaning and happiness in our lives.

Furthermore, the sustainability science pervades this paper through its use of vision as a psychological tool, the consideration of the importance of narratives and discourses around the future of society, as well as the perceived distance between citizens and European political debate.

<sup>143</sup> Jackson, T. (2016). Prosperity without growth: foundations for the economy of tomorrow.

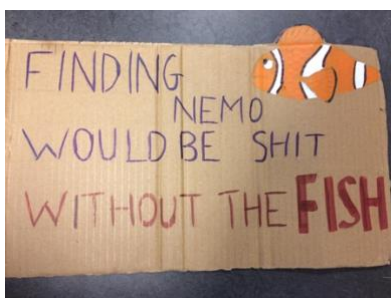


## Appendix E

Pictures from demonstrations of Fridays For Future. Mathilde Vandaele

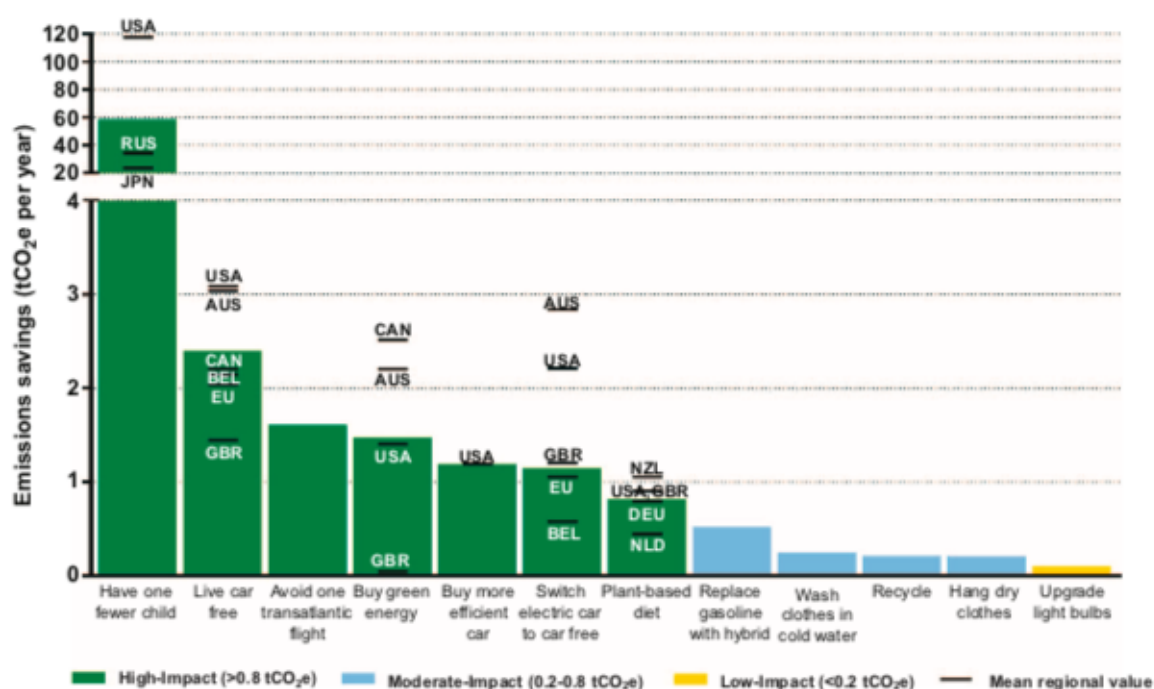








## Appendix F



**Figure 1.** A comparison of the emissions reductions from various individual actions. The height of the bar represents the mean of all studies identified in developed nations, while black lines indicate mean values for selected countries or regions (identified by ISO codes) where data were available from specific studies. We have classified actions as high (green), moderate (blue), and low (yellow) impact in terms of greenhouse gas emissions reductions. Note the break in the y-axis. See supplementary materials 5 for details.

Source: Wynes, S. & Nicholas, A. K. (2017). The climate mitigation gap: education and government recommendations miss the most effective individual actions. *Environmental Research Letters*, 12(7).