YOUNG EUROPEANS: HOW TO ACT ON THE CLIMATE CRISIS?

Advancing green growth in Europe: new approaches for sustainable finance

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Nastasia Dhomps

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Abstract

This article proposes to explore whether green growth can tackle climate change and to investigate how to advance green growth through sustainable finance. The analysis divided into two parts is presented under the form of a policy brief.

The paper aims are to convince that green growth would be compatible with climate mitigation. The climate crisis is probably the biggest challenge of our times and facing such a challenge in a context of green economy requires mobilising massive resources. This article advocates that advancing green growth in the EU would be possible through specific financial tools. An overview of various possible financial stimuli and an evaluation of their potentials are developed in the second part.

The first part of the study proposes to focus on green growth and draws the state of play observing that our planetary boundaries are crossed or about to be crossed. Whether because of climate change or mass extinctions, humanity is at stake and our economic system as well. Indeed, the climate crisis is going to reduce our resources (water, food production, energy production, etc.) and therefore our economic growth model will be impeded or even stopped. Our lifestyle supported by our economic system is one of the causes of climate change. Therefore, we conclude in the first part that our economic system must be reconsidered.

However, the market will not do it by itself and public power needs to act in order to orientate economic development in the right direction. In this study, economic growth and capitalism, two components of our economic system largely accused of being responsible for climate change, are discussed. Degrowth is also debated which leads to advocating for green growth. Green growth according to the European Commission is defined as an economy that "offers a pathway to generate economic growth that is inclusive and environmentally sustainable.". Such economic growth is supposed to "correct" markets and provides incentives to economic actors in order to guide them toward a sustainable and better economic path. The same logic surrounds sustainable finance. Thanks to specific incentives, financial markets are encouraged to invest in low carbon projects and discouraged to invest without environmental considerations. Focusing on what has not been proposed yet by the European Commission (EC) in its strategy on sustainable finance, this article explores how to develop or improve financial stimuli. In line with the EC action plan for sustainable finance, the paper advocates for more engaged in climate mitigation EU institutions. Indeed, the European Investment Bank and the European Central

Bank could do more for tackling climate change. On the other hand, total innovations such as the creation of a social value for non-emitted carbon or a European rating agency could support those public policy transformations.

In a global perspective, this article provides arguments for a future green European economic system and proposes a number of solutions for mitigating climate change.

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Introduction

A first and simple observation makes it clear that climate change is going to reduce our resources (water, food production, energy production, etc.) and therefore our economic growth model will be impeded or even stopped. Indeed, it seems that infinite growth as we tackle it today is "impossible in a finite natural world"[1]. If “business as usual” is dead, according to many political leaders, green growth is the answer to our climate problem but also to our economic problems.[2] Green growth according to the European Commission is defined as an economy that “offers a pathway to generate economic growth that is inclusive and environmentally sustainable.”[3]. Such economic growth is supposed to “correct” markets and provides incentives to economic actors in order to guide them in a sustainable and better economic path.[4] Green growth has been identified by the EU as a “fundamental pillar of EU economic policy” in Europe 2020 strategy however decisions taken in order to fulfil this objective are still shy.[5] Green growth is indeed criticized by the ones calling for degrowth, the ones warning about induced rebound effects and the ones simply not willing to change. Nevertheless green growth and its capitalist paradigm should be legitimately questioned.

In this paper, two questions will be raised. The first one is necessary before going in any direction. Indeed, tools would be different depending on the economic paradigm settled. Thus, the first part of this article aims to determine whether going for green growth could be compatible with climate mitigation. Once an economic paradigm established, this paper aims to investigate how to advance green growth in the EU through financial tools. Indeed, getting on the track of sustainable development will require massive investments. Between 2% and 5%

[1] Arthur Neslen, “Is green growth possible?”, Euractiv, 27 November 2012, https://www.euractiv.com/section/development-policy/news/is-green-growth-possible/, (consulted on 20.06.2019).
[2] Matt McGrath, “Climate scenarios 'being realised"', BBC news, 12.03.2009, http://news.bbc.co.uk/2/hi/science/nature/7940532.stm, (consulted on 27.10.2019).
[3] European Commission, “Moving towards a green economy - policy”, https://ec.europa.eu/europeaid/sectors/environment/environment-and-green-economy/green-economy_en, (consulted on 21.06.2019).
[4] Lucien Georgeson, “The global green economy: a review of concepts, definitions, measurement methodologies and their interactions”, Geo: Geography and Environment Volume 4, Issue 1, 20 April 2017, https://rgs-ibg.onlinelibrary.wiley.com/doi/full/10.1002/geo2.36, (consulted on 20.06.2019).
[5] Arno Behrens and Bert Colijn, “The Socio-Economic Transition towards Sustainability and its Impacts on Jobs in Europe”, in: Intereconomics, vol. 47, no. 3, 2012, 148.

of EU's GDP would be needed annually[6] not only to fuel an energetic transition but also research, energy efficiency or training for job transition. It is the economic system as a whole that will be transformed. Those massive investments will not be made by public money alone, that is the reason why public power must act in order to orientate economic development in the right direction. Because we are in a hurry and because our house is burning, policymakers should give no alternative to markets but to invest with sustainable considerations. In order to give such incentives, this paper will explore in its second part, various financial stimuli possibly implemented by EU policymakers and institutions. Incentives should be made on the financial markets because it is one of the main places where investment abilities are real and sizable. In addition, financial markets are places very reactive and adaptable. It is actually good news since we have little time in front of us.

The second part of this article will oversee positive rather than negative incentives that could be implemented by the legislator. Indeed, whereas negative incentives such as taxes or carbon taps have already been implemented, little positive levers have been experimented yet. However, positive stimuli could be effective especially when negative ones have failed. Positive incentives could be worth implementing because they could influence a broader audience or uncooperative actors. They might not be as cost-effective as taxes, but their potential effectiveness, legitimacy and acceptance among participants would make them worth exploring. Indeed, unlike the EU Emission Trading System (ETS), constrained to arrange higher share of free allowances for activities exposed to a significant risk of carbon leakage, positive financial incentives won't fear production transfer to other countries with laxer emission constraints.[7] Likewise, positive incentives would probably be insensible to the exogenous shocks that struck the ETS and weakened its efficiency.[8] Nevertheless, this article won't advocate for abandoning taxes or cap and trade systems such as the ETS to benefit new positive incentives. It will rather advocate for implementing positive incentives completing

[6] Anne Hessel, Jean Jouzel, Pierre Larrouturou, *Finance, Climat, Réveillez-vous !*, Indigène edition, october 2018, 80.
[7] European Commission, "Carbon Leakage", ec.europa.eu, https://ec.europa.eu/clima/policies/ets/allowances/leakage_en, (consulted on 27/10/2019).
[8] Emma Vermunicht, *The European Union Emissission Trading Scheme and the art of policy learning: a case study research of EU ETS learning experiences*, Master Thesis for the Degree of Master of Arts in European Interdisciplinary Studies of the College of Europe, Supervised by Prof. Christian Egenhofer, 2018-2019, 32.

negative ones. Indeed, in order to guide economic investments in an effective and quick manner, policymakers will probably need to pull every lever at their disposal.[9]

This paper seeks to investigate how to advance green growth in the EU through financial tools however, it does not aim to discuss green standards or benchmarks. Whether the EU should consider nuclear energy as sustainable will not be discussed. Only tools and levers aiming to push towards what the EU has been defining as green will be tackled.

The following paper is divided into 2 big parts. The first part provides a background for the second part and discusses green growth as a credible solution for mitigating climate change. The second part focuses on how to finance green growth and proposes financial incentives for directing private investment toward sustainable assets.

[9] Adam Tooze, « Why central banks need to step up on global warming», Foreign Policy, 20.07.2019, https://foreignpolicy.com/2019/07/20/why-central-banks-need-to-step-up-on-global-warming/, (consulted on 07.10.2019).

Part 1: Green growth

I. State of play: crossing our planet boundaries

In an article proposing solutions to the climate crisis, a quick inventory of the climate emergency is necessary. A first and simple observation makes it clear that climate change is going to strain our access to resources (water, food production, energy production…) and will, therefore, impede or even stop economic growth. Indeed, droughts, heatwaves, forest fires, melting ice, torrential rains or floods among others will become more and more recurrent and costly, in both human and economic terms. Extreme weather events might even lead to a massive destabilisation of the financial system by reducing firms profitability and even lead to bankruptcy in the case of events too extreme for the insurance system.[10] Climate change will slow economic activity, reducing the flow of credits which will lead again to more banks default.[11]

Whether because of resources depletion, massive population migration, or conflicts, not only is economic growth jeopardized: humanity and world peace face dire challenges.[12]

A) Global warming

Global warming is mostly caused by our greenhouse gas emissions, which is good news since it means that we are theoretically in control of the problem.[13] While greenhouse gas emissions reached a new global peak in 2018, public authorities are slowly questioning the established economic system and our way of life.[14] However, commitments to reduce fossil fuel emissions are as yet too small. The United Nations (UN) states explicitly in its report from November 2018 that G20 countries are not on track to meet the target to limit global warming below 2°C.[15]

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[10] Adam Tooze, *op.cit.*
[11] Yannis Dafermos, Maria Nikolaidi, Giorgos Galanis, "Can Green Quantitative Easing (QE) Reduce Global Warming?", Policy Brief July 2018, Greenwich Political Economy Research Centre, 3.
[12] Anne Hessel, Jean Jouzel, Pierre Larrouturou, *op.cit.*, 27.
[13] Anne Hessel, Jean Jouzel, Pierre Larrouturou, *op.cit.*, 39.
[14] Elsa Dicharry, "Les émissions de CO2 en baisse en Europe", Les Echos, 08 May 2019, https://www.lesechos.fr/monde/europe/les-emissions-de-co2-en-baisse-en-europe-1017130, (consulted on 08.09.2019).
[15] Emissions Gap Report 2018, UN Environment Programme, November 2018, XV.

Today, therefore, we are heading toward an increase in temperature of around 3°C at the end of the century which would be disastrous.[16] On top of that, the UN concludes that more ambitious Nationally Determined Contributions than the previously settled ones are necessary by 2020 to meet the jointly agreed goals.[17] According to the UN, solutions are straightforward and simple: we must agree to not consume between 80% and 90% of known underground coal reserves, half of the gas reserves and about a third of oil stocks.[18] However, additional measures are necessary and it is the whole economic system that needs to be adapted. Indeed, considering the scale of the challenge, satisfying ourselves with a simple energy transition and a few adjustments will not be enough.[19] Finally, the energy transition itself is so radical that it cannot be made without a rearrangement of our economic model.

B) Biodiversity

Re-modelling our economic system in order to adapt it to this new context is necessary that even major liberal media institutions have acknowledged it. We can read in the Economist that: "to decarbonise an economy is not a simple subtraction; it requires a near-complete overhaul."[20] Because of the development of fossil fuel consumption, humanity is flirting with planetary boundaries.

Planet boundaries are the thresholds beyond which biophysical phenomena induced by human activities are becoming dangerous for humanity[21]. Beyond those boundaries' humanity must suffer the decline of its material well-being due to the degradation of its environment.[22] Among our planet boundaries we have climate change, biodiversity destruction, ocean acidification, and soil pollution.[23] Most of those interconnected boundaries have been crossed or are about to be.[24]

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[16] Ibid, XIII.
[17] Ibid, XV.
[18] Anne Hessel, Jean Jouzel, Pierre Larrouturou, *op.cit.*, 56.
[19] Arno Behrens and Bert Colijn, *op.cit.*, 148.
[20] "The climate issue", The Economist, 19.09.2019, https://www.economist.com/leaders/2019/09/19/the-climate-issue, (consulted on 25.09.2019).
[21] Eloi Laurent, Jacques Le Cacheux, *L'Economie de l'environnement et économie écologique*, Les nouveaux chemins de la prospérité, Armand Colin 2nd edition, 2015, 13.
[22] *Ibid*, 14.
[23] *Ibid*.
[24] *Ibid*.

The destruction of biodiversity, although less publicized than climate change, is one of the most troubling of these processes. The causes of the loss of biodiversity are multiple: pollution, destruction of habitats through urbanisation or land exploitation, overexploitation of species, climate change. By biodiversity, we refer to "species diversity, genetic diversity, and ecosystem diversity"[25]. Nearly 2 million species have been identified by scientists, although, the total number is estimated to be between 3 and 100 million.[26] The loss of biodiversity since 1970 is estimated to have reached a percentage of 30% and implies an estimated loss of 60% of ecosystem services.[27] Ecosystem services are essential to our well-being and to our economic system. Indeed, an ecosystem service is the capacity of the ecosystem to "help out" humans.[28] Such services are taken for granted yet, pollination, depollution or carbon capture gave only the illusion of inevitability.[29] Overexploiting those capacities leads to their annihilation and these services are only appreciated at their true value when they disappear. Thus, it is often very expensive or impossible to reproduce what was previously done by nature, and especially the services given by biodiversity. As an example, we can take the case of the farmworkers of the Sichuan region in China. A few years ago, because of a lack of pollinating insects killed by insecticides, farmers had to pollinate their apple trees by hand.[30] In the same logic, terrestrial and marine ecosystems play a vital role in climate regulation. Currently, they absorb nearly half of all carbon dioxide emissions generated by humans.[31] Thus, terrestrial ecosystems absorb about 2 100 Gt of carbon dioxide via living organisms and soil organic matter[32], which adds up to about 3 times the amount of carbon in the atmosphere.[33] Likewise, the biggest volume of CO2 is captured by the seabed.[34] According to Global Forest Watch, deforestation is

[25] *Ibid*, 14.
[26] Mike Lee, Paul Oliver, "The Earth's biodiversity could be much greater than we thought", The Conversation, 29.06.2016, https://theconversation.com/the-earths-biodiversity-could-be-much-greater-than-we-thought-61665, (consulted on 22.09.2019).
[27] United Nations, Millennium Ecosystem Assessment, 2005. Ecosystems and Human Well-being: Synthesis. Island Press, Washington, DC, 1.
[28] Eloi Laurent, Jacques Le Cacheux, *op.cit.*, 45.
[29] *Ibid*.
[30] Harold Thibault, "Dans le Sichuan, des « hommes-abeilles » pollinisent à la main les vergers", Le Monde, 23.04.2014, https://www.lemonde.fr/planete/article/2014/04/23/dans-les-vergers-du-sichuan-les-hommes-font-le-travail-des-abeilles_4405686_3244.html, (consulted on 22/09/2019).
[31] European Commission, "Le rôle de la nature dans le changement climatique", August 2009, https://ec.europa.eu/environment/pubs/pdf/factsheets/Nature%20and%20Climate%20Change/Nature%20and%20Climate%20Change_FR.pdf, (consulted on 22.09.2019).
[32] *Ibid*.
[33] European Commission, "Le rôle de la nature dans le changement climatique", August 2009, https://ec.europa.eu/environment/pubs/pdf/factsheets/Nature%20and%20Climate%20Change/Nature%20and%20Climate%20Change_FR.pdf, (consulted on 24.09.2019).
[34] *Ibid*.

responsible for about 8% of global CO2 emissions which is more than the EU's total emissions.[35] On the other hand, forest would be capable of providing "23 per cent of the total mitigation needed between now and 2030".[36] Taking care of those natural carbon pools is essential and could make a decisive contribution to the climate crisis management.[37]

Thus, in order to preserve biodiversity and to allow economic development in symbiosis with nature, we will consider what kind of economic system we could rely on.

II. Degrowth or green growth, does the distinction make sense?

The European Union has set ambitious but necessary goals regarding greenhouse gas emissions. Achieving "at least 40% cuts in greenhouse gas emissions (from 1990 levels)" by 2030 and carbon neutrality by 2050 stand among its main objectives. But in order to meet our commitment, we need to drastically change our development model.[38] Zero greenhouse gas emission by 2050 could be possible but how?

There is an absurdity behind the idea of putting the economy before the planet's health. Such a behaviour would simply leads to a reduction of GDP in the long run. Thus, in the case of the US for example, "global warming could reduce America's GDP by 10 per cent by the end of the century".[39] Defining and justifying an economic theoretical framework in which we will then develop propositions is primordial. Regarding the way to tackle climate change, different schools of thought currently oppose each other. Supporters of degrowth state that infinite growth as we understand it today is "impossible in a finite natural world"[40] while those supporting green growth believe that not only economic growth can be inclusive and

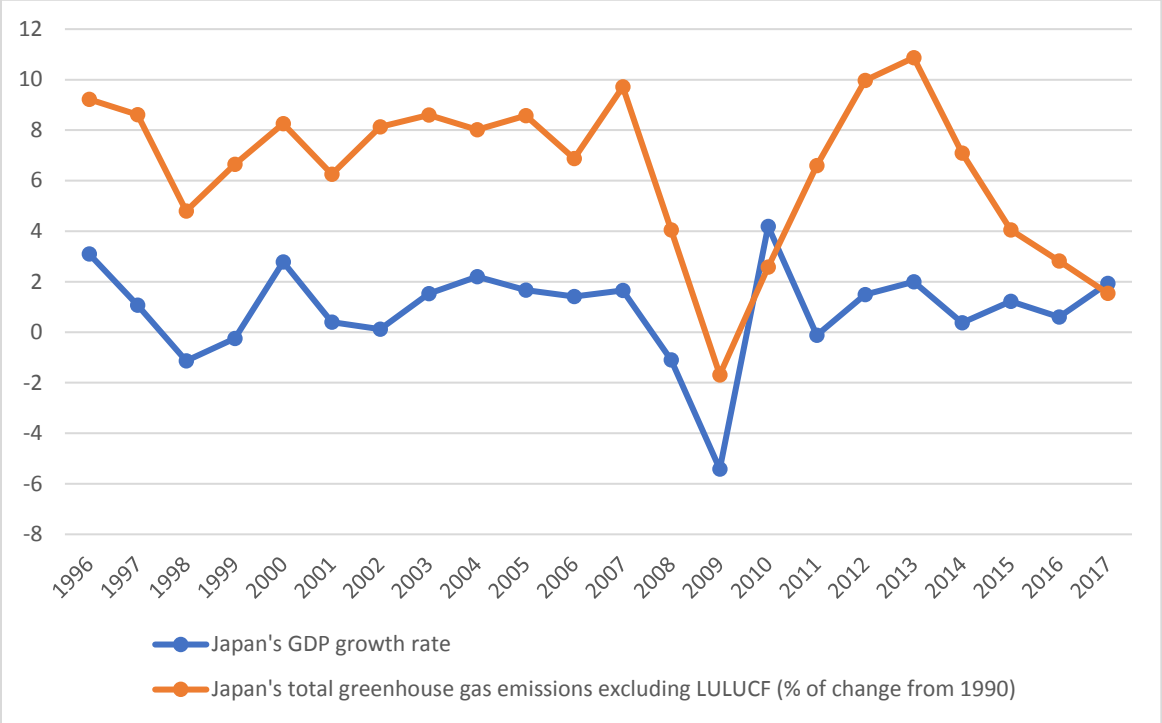
[35] Wolosin, M., and N. Harris. 2018. "Tropical Forests and Climate Change: The Latest Science" Working Paper. Washington, DC: World Resources Institute. Available online at wri.org/ending-tropical-deforestation, (consulted on 24.09.2019), 3.
[36] *Ibid*.
[37] *Ibid*.
[38] European Commission, "Climate strategies and targets", https://ec.europa.eu/clima/policies/strategies/2030_en, (consulted on 08.09.2019).
[39] Lola Seaton, "Green questions", New Left Review, 112 July Aug 2018, 128. https://newleftreview.org/issues/II115/articles/lola-seaton-green-questions
[40] Arthur Neslen, *op.cit*.

environmentally sustainable, but that environmental protection measures can stimulate growth.[41]

We must acknowledge that our current economic system is facing limits. Galloping economic growth has been seriously damaging the environment, although it has brought increasing standards of living and broader access to the benefits of a consumer society.[42] By contrast, it is creating an unequal society in which an important part of goods generates a large amount of waste specifically to satisfy a favoured part of the population.[43] However, if economic growth has been accused of damaging the environment, is it really the case? We need to understand how closely related growth and greenhouse gas emissions really are. Indeed, by looking at Japan's situation, it seems that the correlation is not so obvious. Since 1996, Japan has averaged a small GDP growth of 0,9 % per year.[44] Despite being close to a no-growth state for the last 10 years, it ranks itself among the world's highest carbon-emitting countries with an average of 10,54 tonnes of CO2 per capita and per year since 1990.[45]

[41] Damien Demailly, "Green Growth vs. Degrowth: Beyond a Sterile Debate", Green European Journal, 12 March 2014, https://www.greeneuropeanjournal.eu/green-growth-vs-degrowth-beyond-a-sterile-debate/, (consulted on 08.09.2019).
[42] Robert Pollin, "De-growth vs a green new deal" New Left Review, 112 July Aug 2018, 6. https://newleftreview.org/issues/II112/articles/robert-pollin-de-growth-vs-a-green-new-deal.pdf
[43] Ibid.
[44] According to The World Bank data extracted on 29.09.2019.
[45] Figure calculated from OECD Stat, "Total greenhouse gases emissions excluding LULUCF per capita", data extracted on 29.09.2019, https://stats.oecd.org/Index.aspx?DataSetCode=AIR_GHG.

Table 1: Comparison between Japan's growth rate and its total greenhouse gas emissions (% of change from 1990)



Source: Data from The World Bank and OECD stat

Table 1 displays a comparison between Japan's growth rate and its total greenhouse gas emissions (% of change from 1990). Data have been extracted from The World Bank for Japan's growth rate and from OECD stats for Japan's total greenhouse gas emissions (% of change from 1990). Land use, land-use change, and forestry (LULUCF) is defined by the UN as a "greenhouse gas inventory sector that covers emissions and removals of greenhouse gases resulting from direct human-induced land use such as settlements and commercial uses, land-use change, and forestry activities.".[46] Therefore, LULUCF has an impact on the carbon cycle and this impact can be positive or negative. LULUCF are excluded from Japan's total greenhouse gas emissions because we want here to focus on how much Japan emits CO2 through economic activity. In order to determine whether there is a correlation between Japan GDP growth rate and CO2 emissions rate, a Pearson correlation was done. More the coefficient of Pearson correlation is close to 1 more data are correlated.

[46] Land use, land-use change, and forestry (LULUCF), Glossary of climate change acronyms, UNFCCC website, https://unfccc.int/fr/processus-et-reunions/la-convention/lexique-des-changements-climatiques-acronymes-et-termes#L, (consulted on 30.10.2019).

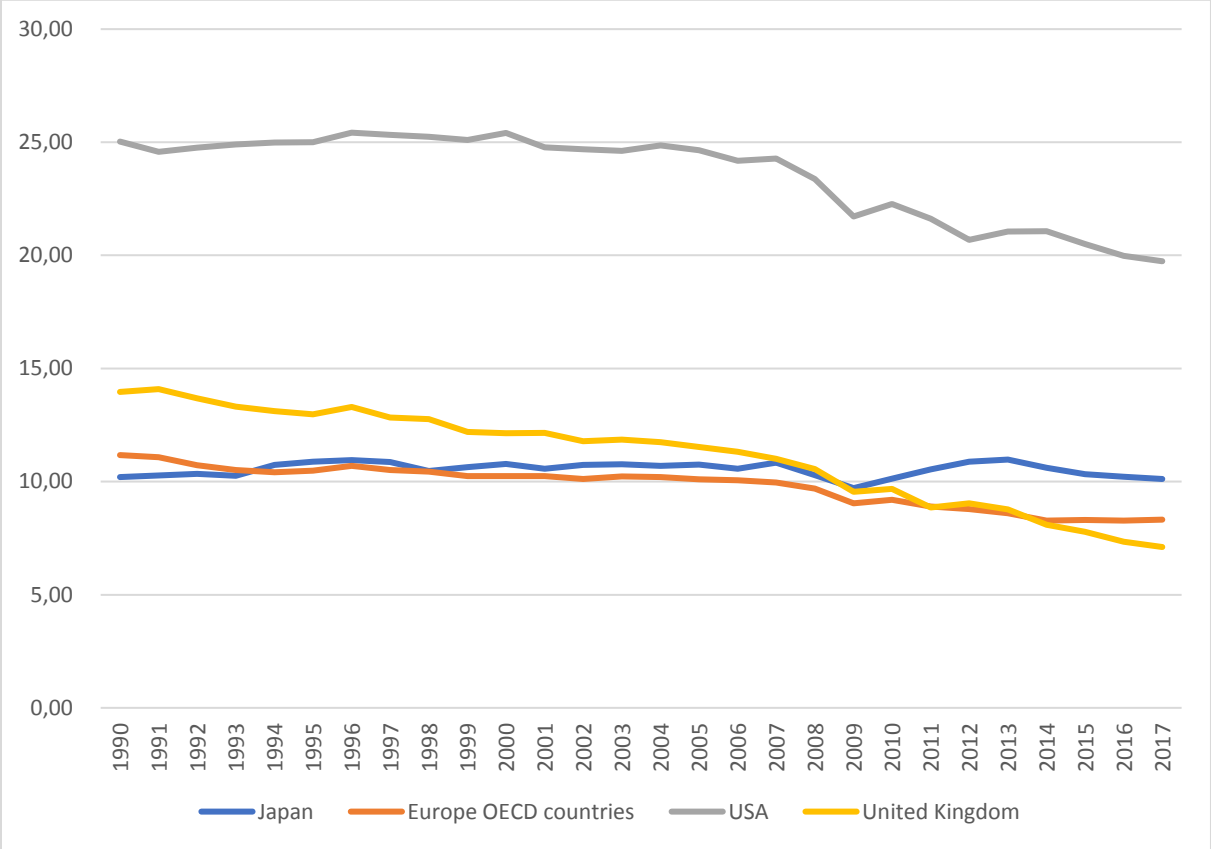
Regarding table 1, we observe that Japan GDP growth rate and CO2 emissions rate are more correlated before 2008 (0.93 coefficient using Pearson correlation) than after 2008 (0.42 coefficient). We observe a drastic fall in addition of both GDP growth rate and CO2 emissions rate in 2008 and 2009 probably explained by the economic crisis of 2008.

According to Ruffing, when greenhouse gas emissions are stable or decreasing and GDP per head growth rate increases, we can define it as an absolute decoupling. A relative decoupling, on the other hand, is defined by a positive growth rate of CO2 emissions but not as much as the GDP growth rate.[47]

Our observation of a strong correlation before 2008 and a smaller one after 2008, could mean that once a certain stage of development is reached, growth and greenhouse gas emissions relatively decouple. Such observation is supported by other studies like the one conducted by the Office of National Statistics of the United Kingdom in October 2019. According to them, "the UK has shown evidence of absolute decoupling of GDP per head and CO2 emissions".[48]

[47] Ruffing, K., "Indicators to measure decoupling of environmental pressure from economic growth. Sustainability Indicators: A Scientific Assessment", 2007, 67, page 211.
[48] George Agbugba, Ginevra Okoye, Mamta Giva, and Joseph Marlow, "The decoupling of economic growth from carbon emissions: UK evidence", Office for National Statistics, 21.10.2019, https://www.ons.gov.uk/economy/nationalaccounts/uksectoraccounts/compendium/economicreview/october2019/thedecouplingofeconomicgrowthfromcarbonemissionsukevidence#conclusion, (consulted on 30.10.2019).

Table 2: Total greenhouse gas emissions excluding LULUCF per capita (tonne of CO2 per capita)



Source: OECD Stat

Regarding Japan's total greenhouse gas emissions per capita, it has not significative decreased since 1990 if we look at table 2. Indeed, we can observe that Japan's emissions are flat. Unlike the US or UK, which experience a decreasing trend of CO2 emissions per capita since 1990, Japan remained slightly stable in its emissions at around 10 tonnes of CO2 per capita.[49]

An explanation for such a stationary state can be made by the use of fossil fuel: about 93% of Japan's total energy consumption was from fossil fuel in 2015 according to the World Bank data.[50] Thus, greenhouse gas emissions may depend more on the type of energy used to fuel on economic growth than economic growth itself.

If there is a possibility for relative decoupling between growth and greenhouse gas emissions, we should still wonder how much growth our system needs. Indeed, low growth is today at the

[49] Figure calculated from OECD Stat, "Total greenhouse gases emissions excluding LULUCF per capita", data extracted on 29.09.2019, https://stats.oecd.org/Index.aspx?DataSetCode=AIR_GHG.
[50] "Fossil fuel energy consumption (% of total) – Japan", The World Bank Data extracted on 29.09.2019, https://data.worldbank.org/indicator/EG.USE.COMM.FO.ZS?locations=JP.

heart of the crisis in industrialised countries.[51] Over the last few decades, governments deployed a broad combination of policy adjustments in order to revive the high economic growth rates associated with the post-WWII period, whether by increasing public debt or by letting inequality growing.[52] Both possibilities in a long-term perspective are unsustainable.[53] Thus, it might be the time to define how much growth our economy needs and how much the obsession with growth is a fantasy, propagated by business' desire to maximize profits at the expense of surpassing planetary boundaries.[54] Indeed, since 2008, capitalism is no longer meeting its promises of development. The drawbacks of capitalism are making ever-increasing profit a structural imperative of the economic system. Such a logic is no longer serving growth or the common good but only the individual pursuit of profit by businesses.[55] Such a process actually contributes little to economic growth.[56] In addition, many have raised the point that there is little coupling between GDP growth and welfare.[57] Indeed, even if there is a correlation between companies' wellbeing and social welfare, measuring how much we produce and consume until a certain extent does not inform us about people's quality of life.[58] Such a reality becoming increasingly hard to ignore as the ideological faith in unending growth is declining.[59] The climate crisis highlights the drawbacks of capitalism and the belief in infinite growth, leaving us before a simple, unavoidable truth: the capitalist system as we know it today must change. But what will replace it?

Degrowth is often presented as an answer to the climate crisis. However, degrowth has several flaws, which leads to thinking that it might not be the right solution.

First of all, we need to take into consideration the actual conditions in which we live: a capitalist and deeply interconnected world. States are interdependent and cannot easily extricate themselves from these relationships (regarding as example, energy supply and food supply). Likewise, the accumulation of sovereign debts forces certain governments to always aspire to restore economic growth in order to facilitate the paying of debt services.[60] We need to be

[51] Anne Hessel, Jean Jouzel, Pierre Larrouturou, *op.cit.*, 56.
[52] *Ibid*.
[53] *Ibid*.
[54] Robert Pollin, *op.cit.*, 7.
[55] Lola Seaton, *op.cit.*, 115-117.
[56] *Ibid*.
[57] *Ibid*.
[58] *Ibid*.
[59] *Ibid*.
[60] Lisa Smith, "How Governments Reduce the National Debt", Investopedia, 19.10.2019, https://www.investopedia.com/articles/economics/11/successful-ways-government-reduces-debt.asp, (consulted on 30.10.2019).

pragmatic: capitalism is what we currently have, and we don't have the time to think about remaking the world.[61] Of course, climate change, because of the scale of the challenge, impels us to put our economic system under scrutiny. It is obvious that adopting the « laissez-faire » approach will not force market actors to solve the climate challenge alone. By demonstrating a certain political pragmatism and setting clear and concrete objectives to coerce the market, results may be obtained quickly.

Degrowth would also raise economic consequences that we might not want such as job losses or lower income.[62] Since degrowth implies a reduction of wealth produced via a reduction of production and consumption, it requires that we abandon our entire social system: including namely, retirement plans, wealth insurance, social redistribution, and investment. Yet, the growth problem is already raised by cutting fossil-fuel: most leaders remain convinced that ecological sustainability is too expensive, will slow economic growth and hence cost jobs.[63]

As a consequence, mitigating climate change will only be possible if we develop smart public policy to tackle the growth problem in the right way. We might not really have the choice of degrowth. A straightforward path would rather be to make up for the losses of cutting fossil fuel by investing in sustainable green growth in sectors needing it.[64] By looking in term of investment a degrowth approach would make the energy transition absolutely impossible.[65] Indeed, where will we find the massive investment needed to transform our energy infrastructures? Even in a degrowth transformation agenda the economy will continue consuming fossil fuel.[66] Some sectors such as clean energy one need massive growth while others like the fossil fuel industries must disappear.[67]

In order to meet these glaring needs for investment and innovation, capitalism could be a more effective solution than degrowth. Indeed, capitalism is very dynamic, quick and adaptable.[68] That is the reason why technological advances have been democratized at a remarkable speed. If we take microprocessors for example: in about 30 years, the global microprocessor market

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[61] Lola Seaton, *op.cit.*, 115-117.
[62] Robert Pollin, *op.cit.*, 7.
[63] Lola Seaton, *op.cit.*, 120.
[64] *Ibid*.
[65] Robert Pollin, *op.cit.*, 7. https://newleftreview.org/issues/II112/articles/robert-pollin-de-growth-vs-a-green-new-deal.pdf
[66] *Ibid*.
[67] *Ibid*.
[68] "The climate issue", The Economist, 19.09.2019, https://www.economist.com/leaders/2019/09/19/the-climate-issue, (consulted on 25.09.2019).

reached 10 billion units.[69] Similarly, sometimes only one country's behaviour can set off a process from which everyone will benefit. For example, Germany's broad renewable-energy investment "spurred a worldwide boom in solar-panel production that made them cheaper for everyone, thus reducing emissions abroad".[70] If they are properly oriented and incentivised, competitive markets could be part of the answer to the climate crisis. By decoupling capitalism from its mode of production, we can imagine climate-compatible capitalism. It would be smaller-scale capitalism, oriented toward knowledge and services rather than production, and operating within specific limits fixed by decision-makers.[71] Following, the arguments made by J. P Fitoussi and E. Laurent, in the New Political Ecology (2008), a decoupling between physical growth and economic growth would be possible by shifting toward a service economy.[72] Whether such a route will really lead to economic growth or to a close-to-stagnation-state is difficult to say. But no matter how much economic growth will derive from such a transition, the central ideological questions are whether growth is ecologically compatible or not and whether capitalism is capable of salvation rather than destruction of our planet.[73] Could capitalism prevent us from the worst possible scenarios? We argue that it can and seek to elaborate on how we might develop a green-growth economic model.

[69] Xavier Fontanet, "Le progrès contre la décroissance", Les Echos, 20.06.2019, https://www.lesechos.fr/idees-debats/editos-analyses/le-progres-contre-la-decroissance-1030800, (consulted on 30.09.2019).
[70] "The climate issue", The Economist, 19.09.2019, https://www.economist.com/leaders/2019/09/19/the-climate-issue, (consulted on 25.09.2019).
[71] Lola Seaton, *op.cit.*, 118.
[72] Jean-Paul Fitoussi, Eloi Laurent, *La nouvelle écologie politique. Economie et développement humain*, Seuil, coll. « La république des idées », 2008.
[73] Lola Seaton, *op.cit.*, 122.

III. Green growth

A) Defining green growth

The opposition between growthism and degrowthism is counterproductive. Green growth cannot meet all the values and concerns proclaimed by degrowth[74] but together they still fight for the same goal: "increasing human well-being and enhancing ecological conditions and equity on the planet".[75]

By being pragmatic and setting simple and precise goals we will set that the first aim of green growth is to cut the consumption of fossil fuel (oil, coal and natural gas). Those cuts must be intense and rapid. One reason may be that 70% of the greenhouse gas emissions comes from our consumption of fossil fuels.[76] Our economies could probably continue to grow tremendously if they would absolutely decouple from fossil fuel consumption.[77]

Based on the definition given by the economist Eloi Laurent, green growth would be concerned both with creating jobs and, reducing inequalities, but also with putting economic mechanisms into sustaining ecosystems, which are the support mechanisms for all our societies and our industries. If we have no more fresh air or water, economic activity will simply become impossible. The idea is to reconcile the two.

B) Challenges

Investment

According to the European Commission, the EU must close an annual investment gap of nearly 180 billion euros in order to meet the EU climate and energy targets by 2030.[78] However, the European Court of Auditors raised the number of 1 115 billion euro investment needed toward

[74] *Ibid*, 119.
[75] "Definition", Research & Degrowth, https://degrowth.org/definition-2/, (consulted on 01.10.2019).
[76] Robert Pollin, "De-growth vs a green new deal" New Left Review, 112 July Aug 2018, 8. https://newleftreview.org/issues/II112/articles/robert-pollin-de-growth-vs-a-green-new-deal.pdf
[77] *Ibid*, 9.
[78] European Commission, "Plan d'action: financer la croissance durable", 08.03.2018.

climate change mitigation annually for the period 2020 – 2030.[79] If nothing is done, the projected damages due to climate change could cost 190 billion euro per year to European households.[80] Depending on objectives (meeting COP21 commitments or becoming carbon neutral) the EU should be investing between 2 and 5 per cent of its GDP every year.[81] It is only by investing such a large amount of money in clean energy, energy efficiency and above all energy-saving that we will meet the challenge to reduce by 40% our C02 emissions by 2030 and to become carbon neutral by 2050.[82] Becoming carbon-neutral means dividing our energy consumption by two and consuming the remaining half from non-fossil fuel sources.[83] Obviously, our economy will still reject CO2: what we need, therefore, is to compensate the greenhouse emissions through negative CO2 technologies.[84]

The NegaWatt think tank brings together many energy-related professionals, as well as economists, sociologists and urban planners promoting an encouraging energy transition scenario based on the principle of sobriety.[85] The principle of sobriety means that the best energy is the one that has not been consumed. We must, therefore, save a lot of energy in addition to looking for renewable energy sources[86]. Saving this energy means "dramatically raising energy-efficiency levels".[87] In order to use less energy and access to the same quality of life we should insulate our buildings in more efficient ways, drive slower and less energy-hungry cars or improve public transport infrastructure.[88] The totality of our consumption and system of production must be rethought within the paradigm of energy transition and the protection of biodiversity. Once energy is saved, the rest of the energy consumed will have to be decarbonised so that fossil fuels not yet consumed remain in the soil.[89] The scale of the change required makes the amount of investments needed seem impossible, but progress is already made in renewable energy technologies as seen in their declining prices. Indeed, in one year the prices of renewable energies fell by 10% and this fall is expected to last according to

[79] European Court of Auditors, "EU action on energy and climate change: a landscape review", 2017.
[80] Valéry Laramée de Tannenberg in Anne Hessel, Jean Jouzel, Pierre Larrouturou, *Finance, Climat, Réveillez-vous !*, Indigène edition, october 2018, 81.
[81] Anne Hessel, Jean Jouzel, Pierre Larrouturou, *op.cit.*, 80.
[82] Anne Hessel, Jean Jouzel, Pierre Larrouturou, *op.cit.*, 59.
[83] *Ibid*.
[84] *Ibid*.
[85] "Scénario négaWatt 2017-2050 Dossier de synthèse", Association négaWatt, January 2017, https://negawatt.org/IMG/pdf/synthese_scenario-negawatt_2017-2050.pdf, (consulted on 15.10.2019).
[86] Ibid.
[87] Robert Pollin, *op.cit.*, 12.
[88] Anne Hessel, Jean Jouzel, Pierre Larrouturou, *op.cit.*, 62.
[89] *Ibid*.

the International Renewable Energy Agency.[90] Finally, one of the measures on which the majority agrees is the necessity of increasing funding for research and innovation. Indeed, innovation is usually recognized as a key element for economic growth.[91] It appears simultaneously that we are not today sufficiently technologically equipped to face climate change, biodiversity extinction, or lack of resources.[92] It is an opportunity for Europe to take the lead in research on the topic. We must also increase cooperation and create a real research community working on the global climate crisis cause.[93]

Rebound effects

Rebound effects are also one of the issues that green growth must overcome. Rebound effects occur when a gain of efficiency increases consumption and by doing so, increases CO2 production instead of diminishing it. Usually, the gain of efficiency is reinvested in an additional consumption producing CO2.[94] For example, a European household saving money by improving the energy efficiency of their home will reinvest this money in a plane trip to Bali. There is nothing wrong by going on holidays to Bali except that it might produce even more greenhouse gas than the CO2 saved previously. On this topic, a Henrich Böll Foundation study shows that "energy efficiency improvements in an economic system will on average yield half the theoretical savings potential".[95] However, with an adapted policy, tackling rebound effects should be possible, especially with eco-taxes since, the study argues, it is what causes the least rebound effects.[96] In addition, rebound effects should be little if we take into

[90] Pierre Zéau, "Le coût de production des énergies renouvelables baisse d'année en année", Le Figaro.fr, 07.06.2019, http://www.lefigaro.fr/conso/le-cout-de-production-des-energies-renouvelables-baisse-d-annee-en-annee-20190531, (consulted on 03.10.2019).
[91] Jorge Núñez Ferrer, "Investing Where It Matters – A Sustainable "Green Growth" Agenda for the EU Budget", in: Intereconomics, vol. 47, no. 3, 2012, 156.
[92] *Ibid.*
[93] Anne Hessel, Jean Jouzel, Pierre Larrouturou, *op.cit.*, 69.
[94] Ulrich Hoffmann, « Can Green Growth Really Work? », Heinrich Böll foundation E-Paper, Berlin, June 2015, https://core.ac.uk/download/pdf/77086026.pdf.
[95] Timan Santarius, « Green Growth Unravelled How rebound effects baffle sustainability targets when the
economy keeps growing », Heinrich Böll Foundation and the Wuppertal Institute for Climate, Environment and Energy, October 2012,
https://www.boell.de/sites/default/files/WEB_121022_The_Rebound_Effect-_Green_Growth_Unraveled_TSantarius_V101.pdf.
[96] Arthur Neslen, *op.cit.*

consideration that the whole economic project will focus on reducing greenhouse gas emissions.[97]

Risks of stagnation

Finally, as highlighted previously, it is difficult to predict whether there will be global degrowth or growth. All environmental measures are not win-win regarding economic growth and protecting biodiversity might not be necessarily good for GDP's growth. Climate change calls for investing in non-remunerative things but it is only because those things have been taken for granted and considered free. Green growth hopes to introduce the value of ecosystem services into our economic calculations. According to a study by Mark Lawrence and his colleagues at the Institute for Advanced Sustainability Studies in Potsdam, something as simple as reforestation could reduce C02 levels by between 0.5 and 3.5 billion tons per year through 2050.[98]

Likewise, eco-taxes should be established with care in order to preserve economic growth. Indeed, to encourage growth, "production inputs and necessary goods should be cheap".[99] If the price of energy were to increase drastically, it would certainly cause a recession as history has shown during oil shocks.[100] Eco-taxes should then orientate investments without holding them down. We can already imagine the potential contradictions. It is important to have in mind that economic growth will not be the supreme objective as it used to be. Leaders should rather develop positive discourses and collective imaginary around our future aims as a society.[101]

The massive investment of about 2 per cent of Europe's GDP every year proposed earlier will produce growth, but it will go along with drastic fossil fuel cuts which will reduce growth.[102] We might go toward a no-growth and steady-state economy. But, a green economy will raise

[97] Robert Pollin, *op.cit.*, 13.
[98] Mark G. Lawrence, Stefan Schäfer, Helene Muri, Vivian Scott, Andreas Oschlies, Naomi E. Vaughan, Olivier Boucher, Hauke Schmidt, Jim Haywood & Jürgen Scheffran, "Evaluating climate geoengineering proposals in the context of the Paris Agreement temperature goals", Nature Communications, 13.09.2018, 4, https://www.nature.com/articles/s41467-018-05938-3.pdf, (consulted on 06.10.2019).
[99] Richard S.J. Tol, "Green Growth: Killing Five Birds with One Stone?", in: Intereconomics, vol. 47, no. 3, 2012, 152.
[100] *Ibid*.
[101] Damien Demailly, *op.cit*.
[102] Robert Pollin, *op.cit.*, 22.

average living standards, improve people's living environment[103], and develop new job opportunities.[104]

Thus, we have imagined what green growth should look like, but a question remains: how to get there? What room for manoeuvre?[105] Public investment will not be the unique answer to this challenge since the whole economic system needs to be reimagined. Public funds would need to be mobilised on a large scale to overcome market failures, but private-sector companies should also invest substantially in adaptation. We can guarantee the scale of action we need only by shaping the financial market.[106] In order to do so, different tools can be used by the legislator: regulations, incentives, and taxes. Each has a different impact on the market. Each can also be perceived very differently by economic actors. We are going to investigate how to advance green growth through sustainable finance and provide an overview of the different financial stimuli possible. Such policy tools would achieve nothing if the institutions taking care of them are not adapted, which is the subject we will address in the first section, through a discussion on institutions and their role in this transition. We will assess their role before giving recommendations as to the ways we might reform some of their activities.

[103] *Ibid*.
[104] Arno Behrens and Bert Colijn, *op.cit*.
[105] Damien Demailly, *op.cit.*
[106] Lola Seaton, *op.cit*, 118.

Part 2: Toward a sustainable finance

In order to guide economic actors, policymakers will need to pull every lever at their disposal.[107] As we saw previously, tackling climate change is a wide and complex technical, economic, and social problem. But to solve it, sustainable finance is a huge chunk of the solution as it is able to mobilize a massive quantity of resources. The essential responsibility of our institutions in all this change is to ensure that money does not stand in the way but goes where it should go.[108]

In addition, to ensure that money responds to these policy signals, institutions should send a clear and strong political message to investors to tackle climate change, as the market itself will not respond to it and will not anticipate it adequately.[109] Fossil energy that should remain in the ground represents about 25 trillion euros of lost revenue for fossil fuel companies over the next 20 years. It likewise signals losses on the value of bonds and assets owned by investors related to this industry.[110] According to Adam Tooze, author of an article for Foreign Policy Magazine: "All told, one-third of equity and fixed income assets issued in global financial markets can be classified as belonging to the natural resource and extraction sectors, as well as carbon-intensive power utilities, chemicals, construction, and industrial goods firms".[111] Thus, the shift toward a neutral carbon economy would induce losses in assets values of the broad industrial sector of 18 trillion euros.[112] If the transition from a carbon-intensive economy to a no-carbon economy is relatively slow but credible enough to give investors time and incentives to adjust, the market will be able to absorb the forecasted losses.[113] But if the shift is abrupt, high financial instability is to be expected.[114] Indeed, the future loss of profitability of carbon-related assets might burst the "unsustainable financial bubbles".[115] Such a burst would make quantity of actors more vulnerable to defaults, possibly leading toward a repeat of 2008.[116]

The first step for undertaking such a transition toward a green economy is to settle what is sustainable and what is not. Indeed, as addressed earlier in our discussion of biodiversity, we

[107] Adam Tooze, *op.cit*.
[108] *Ibid.*
[109] *Ibid.*
[110] *Ibid*.
[111] *Ibid*.
[112] *Ibid*.
[113] *Ibid*.
[114] Yannis Dafermos, Maria Nikolaidi, Giorgos Galanis, *op.cit*., 3.
[115] Adam Tooze, *op.cit*.
[116] Yannis Dafermos, Maria Nikolaidi, Giorgos Galanis, *op.cit*., 3.

must not focus solely on carbon emissions. This could leave us with an economy in which pesticides, nuclear energy or diesel are encouraged. In order to avoid drifting toward greenwashing, the European Commission has since 2018 started developing a taxonomy for sustainable activities. This green taxonomy aims to identify environmentally friendly economic activities.[117] It sets "economic activities which can make a substantial contribution to climate change mitigation and criteria to do no significant harm to other environmental objectives".[118] Providing such tools and methodologies for assessing economic activities would enable market re-orienting capital flows.[119] In addition to the taxonomy, the European Commission has received assistance from expert groups in developing the: "EU Green Bond Standard, benchmarks for low-carbon investment strategies and guidance to improve corporate disclosures of climate-related information".[120]

All these provisions are part of a broader strategy laid out in the action plan for sustainable finance developed by the European Commission in 2018. This action plan aims to:

- "Reorient capital flows towards sustainable investment, in order to achieve sustainable and inclusive growth.
- Manage financial risks stemming from climate change, environmental degradation and social issues.
- Foster transparency and long-termism in financial and economic activity"[121].

Proposals that follow in this article will be in line with the above objectives and confirm the need to act now, to act seriously and proportionately in order that future investments are conducive with sustainable considerations.

[117] EU Technical Expert Group on sustainable finance, "Overview of the EU Technical report on EU Taxonomy Technical report by the TEG", https://ec.europa.eu/info/sites/info/files/business_economy_euro/banking_and_finance/documents/190618-sustainable-finance-teg-report-overview-taxonomy_en.pdf.
[118] EU Technical Expert Group on Sustainable Finance, "Taxonomy Technical Report", June 2019.
[119] *Ibid.*
[120] *Ibid.*
[121] *Ibid.*

I. Mobilising institutions

A) The European Investment Bank

As stated earlier, meeting the target of 1.5 – 2 degree of warming will require massive economic investments. The EIB with its average lending volume of 80 billion per year is an essential tool in the hands of the EU policymakers.[122] Yet, the EIB has sometimes shifted away from investing in the common good, devoting its resources excessively towards investments that will preserve its triple-A credit rating.[123] Thus, since 2013 between 11 and 13 billion euros have been lent to fossil fuel companies and their activities.[124] According to a recent article by Euractiv on the greening of the EIB's lending activities, the bank's "new policy would make its activities consistent with the goals of the Paris Agreement on climate change", which means that there is a clear gap between the bank current actions and the EU's goals.[125]

Following Ursula von der Leyen's proposition on revising the EIB's mandate to include the requirement that it serves as "a climate bank", we recommend the EIB or its future climate subsidiary to invest massively on climate mitigation projects while becoming itself carbon neutral in its overall investments. Indeed, if 1.5 – 2 degree scenarios give us "just over 10 years to turn the tide on the climate and environmental emergency"[126] it does not allow the EIB to reach rentability requirements on carbon-emitting projects by then. If the bank keeps lending to fossil fuel projects, it might never get its money back since those projects will have to stop their carbon-emitting activities over the next 10 years. Therefore, investments in greenhouse gas-emitting projects should be only very exceptional.

In order to ensure that the EIB correctly fulfils its climate objectives, the European Court of Auditors should be able to evaluate the bank's activities thereby controlling EIB actions, which

[122] Xavier Sol, "A "facelift" to the EIB: the EU financial arm needs forward-looking reforms", Euractiv, 22.06.2018, https://www.euractiv.com/section/banking-union/opinion/fri-a-facelift-to-the-eib-the-eu-financial-arm-needs-forward-looking-reforms/, (consulted on 08.10.2019).
[123] *Ibid.*
[124] Leslie Hook, "European Investment Bank postpones decision on natural gas lending", Financial Times, 15.10.2019, https://www.ft.com/content/6e90906a-ee9f-11e9-ad1e-4367d8281195, (consulted on 15.10.2019).
[125] Sam Morgan, "EIB begins metamorphosis into climate bank", Euractiv.com, 09.09.2019, https://www.euractiv.com/section/energy-environment/news/eib-begins-metamorphosis-into-climate-bank/, (consulted on 09.10.2019).
[126] Leslie Hook, *op.cit.*

have for the moment remained quite free from any regulatory interference except the one from those coming from member states constituting the EIB board.[127]

Revising the EIB's mandate to incorporate the statue of "a climate bank" requires increasing the use of green bonds, which the EIB starting using ten years ago. Buying a green bond means that the money will be allocated only to green projects and inform the buyer about how much CO2 will be saved thanks to the investment. As finance has great potential to spur economic dynamism, the use of green bonds is a powerful way to create quick incentives in the right direction. By adopting in June 2019, a taxonomy for green investment, the European Commission will enable the EIB to use green bonds by embracing new sustainability standards and safeguarding those bonds to drift toward greenwashing.[128] Thus, green bonds sold by the EIB would become even more visible and transparent to investors looking for this type of product.[129] Recently, demand for green bonds experienced exponential growth yet the green bond market still accounts for less than 1% of total outstanding bonds on the global market.[130]

The powers of the EIB should be strengthened, in terms of its investing volume but also in terms of its ability to take on more risky investments.[131] Indeed, the EIB should persist even more in its pioneering role and invest where conventional investors are cautious.[132] The EIB would be more useful for supporting green and potentially risky economic opportunities, than by allocating easy billions in photovoltaic or wind industry.[133] Especially because those sectors are already generously financed by private investors.[134]

Regarding the future of the European Fund for Strategic Investment (EFSI), also known as the Junker Plan, reforms could be made concerning the role of the fund for mitigating climate change. The European Commission in its action plan for financing sustainable growth stated that at least 40% of the EFSI will ought to be directed toward financing infrastructure and

[127] Xavier Sol, *op.cit*.
[128] European Commission, Communication from the Commission, "Action Plan: Financing Sustainable Growth", Brussels, 08.03.2018, COM/2018/097 final, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52018DC0097.
[129] *Ibid.*
[130] *Ibid*.
[131] European Economic and Social Committee, "European Finance-Climate Pact (own-initiative opinion)", Adopted on 17.10.2018, NAT/735-EESC-2018-01241, https://www.eesc.europa.eu/en/our-work/opinions-information-reports/opinions/european-finance-climate-pact-own-initiative-opinion, (consulted on 18.10.2019).
[132] *Ibid.*
[133] *Ibid.*
[134] *Ibid*.

innovation to support climate action projects.[135] Some experts, however, such as Anna Roggenbuck judges the current fund's contribution to tackling the climate crisis to be too limited.[136] Indeed, according to the NGO Bankwatch, if we apply the EIB's standard methodology, only 29% of the projects signed under the Infrastructure and Innovation Window (one of the 2 components of the EFSI) between 2015 and 2018 contributed to green investment projects.[137] Likewise, fossil fuels infrastructures remain for investments from the fund: "until April 2019, EFSI guarantees for fossil fuels reached over EUR 2.6 billion, more than for energy efficiency (EUR 2.3 billion) over the same time period".[138] In the same way as EIB's conventional lending projects', the EFSI should become carbon neutral. Climate mitigation instead of economic growth and jobs should become the first priority of the fund.

B) The European Central Bank

We need the European Central Bank to fully engage itself in the fight against climate change. Since the 2008 crisis, the European Central Bank (ECB) has been focusing on strengthening private bank stability and resilience. Through this macroeconomic surveillance, the ECB has been conducting stress tests and requiring more important capital safeguards to hedge against the risk of losses on bank's loans and other investments. Indeed, financial stability is the main goal of the ECB. However, preparing markets for the worst to come with stress testing won't make any sense if the ECB doesn't simultaneously take into account the primary cause of future economic and social stress: climate instability and breakdown. Indeed, at some point extreme events will become so frequent that no matter how resilient you are it will surpass market resilience.[139] Of course, improving financial stability is needed but the ECB is preparing only very superficially for the climate problem, just as it has been underprepared for previous challenges. According to Adam Tooze, the ECB has only partially managed the threat of financial stability, as many banks can still be considered too-big-to-fail. Today, the financial

[135] *Ibid.*
[136] Bankwatch Network, "Too soon to call the "Juncker Plan" a success – new report", 01.10.2019, https://bankwatch.org/press_release/too-soon-to-call-the-juncker-plan-a-success-new-report, (consulted on 19.10.2019).
[137] Anna Roggenbuck, Xavier Sol, "Not worth celebrating-yet?", Bankwatch Network, Counter Balance Challenging Public Investment Bank, September 2019, 4.
[138] *Ibid*, 17.
[139] Adam Tooze, *op.cit.*

sector is still as concentrated, if not even more so, and these banks will themselves be threatened by the risks of climate change.[140] Yet, the ECB has the power to be a major force in the search for solutions to the climate crisis.[141]

During the financial crisis of 2008, the ECB showed already that it was able to engage on a large scale to stabilize European banks by injecting massive liquidity into the financial system.[142] The climate crisis is even more important and preparing ourselves through macroeconomic surveillance and better rules for emitting green bonds is potentially not enough.[143] The ECB should instead explore how it can contribute to rapidly decarbonise the economy and prevent the financial fallout related to climate change.

As discussed earlier, the EIB should fund a larger part of the decarbonising process by supporting more sustainable projects and thus selling more green bonds. The EBC, therefore, has the capacity to support the EIB's actions through non-standard monetary policy tools.

Non-standard monetary policy tools

One of the most famous non-standard monetary policy tools implemented by the ECB is quantitative easing. Quantitative easing started in 2015 when Mario Draghi sought to support economic growth across the euro area by inserting 1 000 billion euros of liquidity into the economy by buying state and corporate bonds.[144] The goal of quantitative easing was to provide more liquidity to banks in order to lower the cost of borrowing money and thereby spur investment.[145] These purchases were successful in lowering borrowing rates.[146] While Mario Draghi announced the extension of quantitative easing (which stopped last year) starting in

[140] *Ibid.*
[141] *Ibid.*
[142] *Ibid.*
[143] *Ibid.*
[144] Anne Hessel, Jean Jouzel, Pierre Larrouturou, *Finance, Climat, Réveillez-vous !*, Indigène edition, october 2018, 85.
[145] European Central Bank, "How quantitative easing works", https://www.ecb.europa.eu/explainers/show-me/html/app_infographic.en.html, (consulted on 20.10.2019).
[146] Yannis Dafermos, Maria Nikolaidi, Giorgos Galanis, "Can Green Quantitative Easing (QE) Reduce Global Warming?", Policy Brief July 2018, Greenwich Political Economy Research Centre, 2.

November 2019 with the purchase of another 20 billion euros of bonds per month,[147] there is still a lively debate on how effective such a measure has been in stimulating economic activity.[148]

The same logic of economic stimulus was behind the implementation of another non-standard monetary policy tool, the European Central Bank's negative interest rate loans called Targeted Longer-Term Refinancing Operations (TLTRO). This measure enables banks to make money while borrowing from the ECB,[149] while placing limited restraints on banks who take advantage of these negative interest rate loans.[150] Indeed, according to Joost Bats and Tom Hudepohl, even though lending in the real economy increased thanks to TLTRO, "more binding benchmark would have been even more effective in stimulating bank lending."[151]. But to benefit from these negative loans after the recently relaunched TLTRO, it suffices that banks "exceed their benchmark stock of eligible loans by 2.5% as at 31 March 2021".[152] Apart from those constraints, little restrictions are imposed regarding the use of the money lent by the ECB.[153]

The last implementation of non-standard monetary policy tools led to the creation of nearly 2 600 billion euros for the financial system: 1 450 billion euros via quantitative easing and 1 200 billion via negative lending operations.[154] However, through this mechanism for stimulating the European economy, only 11% of the sum made available by the ECB has been distributed in new loans by private banks. This means that the rest has contributed to financial market speculation without any restriction on the type of financial products involved.[155]

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[147] "The ECB cuts interest rates and restarts quantitative easing", The Economist, 12.09.2019, https://www.economist.com/finance-and-economics/2019/09/12/the-ecb-cuts-interest-rates-and-restarts-quantitative-easing, (consulted on 14.10.2019).
[148] Yannis Dafermos, Maria Nikolaidi, Giorgos Galanis, "Can Green Quantitative Easing (QE) Reduce Global Warming?", Policy Brief July 2018, Greenwich Political Economy Research Centre, 2.
[149] Isabelle Couet, « Les banques se ruent sur le prêt à taux négatif de la BCE », Les Echos, 24 mars 2017, https://www.lesechos.fr/2017/03/les-banques-se-ruent-sur-le-pret-a-taux-negatif-de-la-bce-169858, (consulted on 12.10.2019).
[150] Anne Hessel, Jean Jouzel, Pierre Larrouturou, *Finance, Climat, Réveillez-vous !*, Indigène edition, october 2018, 85.
[151] Joost Bats and Tom Hudepohl, "Impact of targeted credit easing by the ECB: bank-level evidence", Working Paper No. 631, April 2019, De Nederlandsche Bank NV, 13.
[152] European Central Bank, "ECB announces details of new targeted longer-term refinancing operations (TLTRO III)", Press Release, 06.06.2019, https://www.bde.es/f/webbde/GAP/Secciones/SalaPrensa/ComunicadosBCE/NotasInformativasBCE/presbce2019_78en.pdf, (consulted on 20.10.2019).
[153] Anne Hessel, Jean Jouzel, Pierre Larrouturou, *Finance, Climat, Réveillez-vous !*, Indigène edition, october 2018, 86.
[154] *Ibid*.
[155] *Ibid*.

An important supplement to these measures for the ECB would be rules stipulating a greening of non-standard monetary policy tools redirecting injected money into the right investment avenues.

Green quantitative easing

The idea behind green quantitative easing is as follows: "instead of buying any type of bonds, central banks should buy bonds that have been issued by firms or governments that intend to fund sustainable projects".[156] By doing so, investors would have more incentives for directing capital toward green projects. It will also become less risky to invest in such projects that are usually taking more risks than conventional oil industry assets because of technology uncertainty for example. In the long-term, Green Quantitative Easing will also reduce the cost for green project borrowers. Green quantitative easing will no longer have as a primary objective to enhance economic growth. Its exclusive purpose should be to redirect the economy towards a more sustainable future.

The policy brief released by the Greenwich Political Economy Research Centre tells us that in practice green quantitative easing could be a tool for the ECB that would not require fundamental changes to its mandate.[157] As the main target of the ECB is not only price stability but also financial stability, it could be argued that climate change is going to destabilize the financial and economic system and that the ECB has to implement sustainability targets in order to preserve price and financial stability.[158]

According to the study conducted by Yannis Dafermos, Maria Nikolaidi, and Giorgos Galanis, green quantitative easing can contribute to fighting climate change. By implementing a long-term programme committed to run independently of any other conventional quantitative easing, the ECB could contribute to lower "the interest rate on green bonds compared to the interest rate on conventional bonds."[159] Such a programme would boost investments in green projects that respect the green EU taxonomy and thus would help avoid 0.5° temperature rise by 2100

[156] Yannis Dafermos, Maria Nikolaidi, Giorgos Galanis, "Can Green Quantitative Easing (QE) Reduce Global Warming?", Policy Brief July 2018, Greenwich Political Economy Research Centre, 2.
[157] Yannis Dafermos, Maria Nikolaidi, Giorgos Galanis, "Can Green Quantitative Easing (QE) Reduce Global Warming?", Policy Brief July 2018, Greenwich Political Economy Research Centre, 2.
[158] *Ibid*, 3.
[159] *Ibid*.

relative to a business-as-usual scenario.[160] Such a result is positive but implies that many other levers have to be pulled in order to reduce greenhouse emissions.[161]

Green Targeted Longer-Term Refinancing Operations

In the same vein as green quantitative easing, implementing green binding benchmarks could be an alternative to standard TLTRO. The borrowing rate set in the TLTRO would not be related anymore to the number of loans to non-financial corporations and households but to the degree of sustainability of the loan. Thus, as more bank investments will move towards CO2-emitting sectors, interest rates will rise higher. Some types of investment, such as those in the fossil fuel industry, could even be excluded from the TLTRO targeted operations.

II. Positive incentives

The current financial system (banks, pension funds, insurance, bond markets) does not know how to redirect its savings towards long-term infrastructure investments likely to allow the transition to a low-carbon economy.[162] Yet, as stated earlier, massive investments are necessary. While taxation is the first tool available to policymakers when market forces need to be corrected, positive incentives and stimuli can also be significant players.

A carbon tax or any other form of carbon trading system will not be sufficient to reorient investments.[163] Such measures will even have a very little impact if there is no worldwide agreement setting an emissions quota for each country and a market for pricing and taxing carbon. On the other hand, if negative stimuli are difficult to agree on, positive ones could have

[160] *Ibid.*
[161] *Ibid.*
[162] European Economic and Social Committee, "European Finance-Climate Pact (own-initiative opinion)", Adopted on 17.10.2018, NAT/735-EESC-2018-01241, https://www.eesc.europa.eu/en/our-work/opinions-information-reports/opinions/european-finance-climate-pact-own-initiative-opinion, (consulted on 18.10.2019).
[163] Michel Aglietta and Jean-Charles Hourcade, "Can Indebted Europe Afford Climate Policy? Can It Bail Out Its Debt Without Climate Policy?", in: Intereconomics, vol. 47, no. 3, 2012, 161.

more success in achieving a consensus between different states and actors. Thus, creating positive new financial incentives could be an important alternative for redirecting private investors. With this in mind, we will propose positive financial stimuli measures not yet considered by European policymakers.

A) Social value for non-emitted carbon

Among the propositions for positive stimulus, the one developed by Michel Aglietta and Jean-Charles Hourcade consists in reducing the risk of investment in low carbon projects by creating "social value for non-emitted carbon".[164] Such a non-emitted carbon asset would hence increase investment incentives in low carbon projects relative to other investments that are less risky in the short term, but more damaging to the environment.[165] This new kind of non-carbon emitting assets could be instituted by the European Central Bank to any green bond emitter and their price would be fixed on an agreed carbon value.[166] Later on, those assets could be accepted by the central bank and constitute a reserve asset like gold once the low-carbon project is close to completion.[167] Those assets could take the form of a "carbon certificate" with which private banks would be able to provide loans "at preferential rates to low-carbon projects" thanks to the new added value derived from the carbon certificate.[168] Those certificates would also provide a reliable quality label for banks when they will propose to their clients low-carbon financial products.[169] Indeed, such certificates could be highly valuable for domestic savers looking for reliable asset similar to gold. Carbon certificates are not only "ethical" and come with strong public guarantees, but they will also ensure "a return on investment slightly above that of usual safe deposits".[170] "They would thus be interested in using the credit facilities provided by the ECB to fund the economy instead of using them to restore their balance sheet".[171] However, we need to be aware that those new assets could easily be used for speculative purposes if the value of carbon is not fixed by convention.[172] The ECB would be

[164] Aglietta & Hourcade, *op.cit*., 163.
[165] *Ibid*.
[166] *Ibid*.
[167] *Ibid*.
[168] *Ibid*.
[169] *Ibid*.
[170] *Ibid*.
[171] *Ibid*.
[172] *Ibid*.

also able to control the quantity of carbon emitting assets depending on targets and project competition.[173]

B) A European rating agency

The European Commission proposed in June 2019 guidelines on non-financial reporting as part of its action plan for financing sustainable growth.[174] Those guidelines are the first step toward climate-related reporting with which companies would be encouraged to disclose a number of climate-related information concerning their activities. Along with green taxonomy, it will in the future allow us to scale climate change related risk on companies future profits and how companies activities impact the climate. These measures are necessary and essential to systematically integrate sustainability into risk management, but additional tools can also help achieve these goals. Among these would be the creation of a European rating agency.

Credit-rating agencies play an essential role in the pricing of financial instruments and financial assets.[175] The ratings range from AAA (the best) to D (in lowest) and are made on the basis of the perceived ability of an actor to repay its debt. However, among the risks threatening the ability of actors to repay their debt is climate change, which remains poorly understood and assessed by credit rating agencies.

In its action plan for financing sustainable growth, the European Commission stated as its 6th objective the better integration of environmental sustainability into ratings and market research. In order to do so, they proposed "to mandate credit rating agencies to explicitly integrate sustainability factors into their assessments".[176] Yet, creating a European rating agency would not contradict this first proposal and would instead encourage better coherence with the new taxonomy explained above. Indeed, the European rating agency would use European green standards immediately and properly.

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[173] *Ibid.*

[174] European Commission, "Guidelines on non-financial reporting: Supplement on reporting climate-related information", 20.06.2019, (2019/C 209/01), https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52019XC0620(01)&from=EN.

[175] European Commission, Communication from the Commission, "Action Plan: Financing Sustainable Growth", Brussels, 08.03.2018, COM/2018/097 final, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52018DC0097.

[176] European Commission, Communication from the Commission, "Action Plan: Financing Sustainable Growth", Brussels, 08.03.2018, COM/2018/097 final, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52018DC0097

This is not the first time that the idea of a European rating agency has been put forward. The creation of such an agency has often been proposed by policymakers in order to insert more diversity into the financial rating industry, which is now dominated by the "big three": Moody's, Standard & Poor's and Fitch[177]. These rating agencies have been heavily criticised for the opacity of their rating method, and the risk of conflicts of interest. Creating a European rating agency would, therefore, be an alternative to these agencies, providing, in addition, better rates for European bonds. However, some studies have raised doubts about the benefits of a European credit rating agency.[178] Indeed, if the aim is to rate Eurozone countries more favourably and by doing so influence the bond market, creating a European credit rating agency would have little impact according to Marc Altdörfer.[179]

However, creating a European rating agency aiming to fully integrate sustainability as a rating criterion has received little attention. Yet, creating such an agency could foster the common language needed for the EU taxonomy on sustainable activities and hence assess companies through the tools and methodology proposed in the taxonomy report. The agency would be able to rate how much each financial product contributes to EU sustainability objectives and how much climate change increases risks on companies' future profits. Thus, instead of waiting for "the big three" to explicitly integrate sustainability factors into their assessments, the EU could take the lead and take immediate action. Likewise, work would be all the more facilitated today by the introduction of new European guidelines to improve corporate disclosures of climate-related information.[180] However, unlike the Commission's current proposal, company's climate-related information should be made public, as it is currently the case for the publication of balance sheets. Thus, ratings produced by the European rating agency accompanied by the mandatory publications of companies would initiate a real awareness. Companies seeing their environmental impact revealed and assessed in a reliable and transparent way would be much more concerned by the image they convey. In addition, by relying on the same European

[177] Christopher Alessi, "The Credit Rating Controversy", Council on Foreign Relations, 19.02.2015, https://www.cfr.org/backgrounder/credit-rating-controversy, (consulted on 24.10.2019).
[178] Marc Altdörfer, "The case for a European rating agency: Evidence from the Eurozone sovereign debt crisis", Journal of International Financial Markets, Institutions and Money, Volume 58, January 2019, Pages 1-18, https://www.sciencedirect.com/science/article/pii/S1042443118301847, (consulted on 24.10.2019).
[179] *Ibid*.
[180] European Commission, "Guidelines on non-financial reporting: Supplement on reporting climate-related information", 20.06.2019, (2019/C 209/01), https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52019XC0620(01)&from=EN.

benchmarks for disclosing and assessing climate impact, the EU could take the lead and extend its green normative power to the rank of international standard.

Conclusion

The "Green New Deal" has already convinced many European political leaders and figures such as the European Commission first Vice President Frans Timmermans[181]. Through our journey across the credibility of green growth tackling climate change, we have drawn some conclusions.

We first mention that the wellbeing of our economic system is at stake. It is at stake, not only because of global warming but also because of the sixth mass extinction event underway.[182] These two phenomena pose a lasting threat to humanity, but there is still good news: we are the cause of this threat and we have the means to stop this crisis. In order to do so, our economic system must be rethought.

Hence, different economic alternatives were considered. Economic growth and capitalism, two components of our economic system largely accused of being responsible for climate change, were discussed.[183] We underlined trough Japan's example that economic growth might not be correlated to greenhouse gas emissions. On the other hand, we also mentioned that if CO2 emissions might not be correlated with growth, they were instead highly correlated with the use of fossil fuels. Thus, if economic growth would not be to blame, capitalism in its turn, would involve drawbacks by not considering negative externalities.

Nevertheless, we highlighted that abandoning economic growth or capitalism would not be pragmatic for solving the climate crisis. Indeed, capitalism could be capable of salvation rather than destruction of our planet if it is properly oriented and incentivised. Thus, green growth could be compatible with climate mitigation. However, advancing green growth would be possible only through massive investments. Even if we keep a growthist and capitalist logic, the whole economy must turn green and such a transition will require between 2% and 5% of

[181] Dave Keating, "The Green New Deal Has Been Handed To The EU's Vice President", Forbes.com, 10.09.2019, https://www.forbes.com/sites/davekeating/2019/09/10/eu-vice-president-put-in-charge-of-europes-green-new-deal/#b7adac8f561f, (consulted on 27.10.2019).
[182] Damian Carrington, "Earth's sixth mass extinction event under way, scientists warn", The Guardian, 10.07.2017, https://www.theguardian.com/environment/2017/jul/10/earths-sixth-mass-extinction-event-already-underway-scientists-warn, (consulted on 29.10.2019).
[183] George Monbiot, "Dare to declare capitalism dead – before it takes us all down with it", The Gardian, 25.04.2019, https://www.theguardian.com/commentisfree/2019/apr/25/capitalism-economic-system-survival-earth, (consulted on 29.10.2019).

EU's GDP annually.[184] Because financial markets have real and large funding capabilities, we focused on a second part, that is on how to advance green growth through financial tools and levers. In line with the objectives set by the action plan for sustainable finance of the European Commission, we investigated potential positive stimuli directing private investment toward sustainable assets. Regarding the EU institutions, we concluded that both the European Investment Bank and the European Central Bank could do more for tackling climate change. The EIB should increase its emissions of green bonds, take more risks in green sectors and stop lending to fossil fuel infrastructures. The ECB, on the other hand, should start greening its non-standard monetary policy tools by implementing green quantitative easing and green TLTRO. Indeed, climate mitigation instead of economic growth should become the first priority.

Financial innovations have also been examined in order to support those public policy transformations. Firstly, we tackled the creation of a social value for non-emitted carbon as a new financial asset increasing investment attractiveness in low carbon projects compared to other investments less risky but damaging the environment. Then, the creation of a European rating agency was studied as an effective support for improving transparency and long-termism in financial and economic activity. We highlighted that such an agency would foster companies' and investors' understanding of the financial implications associated with climate change. Hand in hand with compulsory disclosure of climate-related information of companies' activities, risks and opportunities will be more accurately priced.[185]

This article did not assess proposals already made by the European Commission during its work on sustainable finance and merely explored not envisaged and relevant measures supporting the EU objectives. This research does not claim to give an exhaustive overview of the possibilities open to the EU to advance green finance. Many other opportunities are certainly possible.

The willingness displayed by the European Commission for greening financial markets should now start experimentation and implementation phases before it falters. The climate crisis is probably the biggest challenge of our times and it will be faced only if it becomes a priority. Therefore, sustainable finance is only one piece of the green growth puzzle and all economic sectors should now start integrating into their policy environmental considerations and objectives.

[184] Anne Hessel, Jean Jouzel, Pierre Larrouturou, *op.cit*. 80.
[185] Task Force on Climate-Related Financial disclosures, "Task Force on Climate-related Financial Disclosures: Status Report" June 2019, p.V

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