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Sustainable recovery from Covid-19 pandemic

A triple tsunami of crises

Currently, the world is facing three major crises at the same time. First, the Covid-19 Pandemic, which is controlled with measures like social distancing, and has triggered a huge effort in biological research for the launching of vaccines and cures that can protect the world population from this virus. Then, a huge economic recession emerged as a result of the pandemic and the closing down of the economy. Governments need to channel financial support to public and private institutions, safeguard the small and medium sized enterprises against bankruptcy, support vulnerable citizens and ensure job positions. Moreover, appropriate policies are required to protect the financial system from mounting non-performing loans and of course, fiscal packages, comparable to the crisis-related loss of GDP, are needed and should be financed by the national debt.

The third crisis is climate change, which is being faced for the last few decades, but now the effects are becoming more frequent and more extensive and intense. Climate change is the mother of all crises and affects both human and economic lives. There is intensive scientific

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speculation that the pandemic is one of the effects of the climate crisis because deforestation and the loss in biodiversity have brought humans very close to the wild life and this has made it easier for zoonotic viruses to make the cross-species leap. No country all over the world is not experiencing the drastic effects of climate change. The average annual economic losses of climate-related disasters are estimated in hundreds of billions. Further, geophysical disasters, of which 91% are climate-related, have cost 1.3 million human lives and 4.4 billion injuries between 1998 and 2017.

In 2015 in Paris, 197 countries signed an agreement to try to keep the increase of the average global temperature below 2°C. But now we know that 2° is too much. The temperature increase must be limited to below +1.5°C. Beyond this increase in temperature, both the risk of extreme weather events and poverty for hundreds of millions of people will significantly increase. Currently, there is neither technology available to help human beings survive in increasing temperature conditions, nor the means to face the consequences of such a situation. We are still far from the +1.5°C and the UNEP Emissions Gap Report 2019[1] has indicated that global emissions need to be cut by 7.6% per year, to achieve this target. It has been calculated that this cut is translated to a global reduction of CO_2 emissions by at least 68% by 2030. In Europe, the ambition for limiting CO_2 was 41% until September 2020. But then, the President of the European Commission announced an increase to the European ambition to at least 55% reduction in greenhouse gas emissions compared to 1990.

[1] UNEP: Emission Gap Report 2019, Nairobi: UNEP 2019, online available at https://www.unep.org/resources/emissions-gap-report-2019.

Sustainability policy framework

Generally, there is a lot of top-down mobilisation that can allow us to at least have a blueprint for identifying the pathway towards recovering from the three simultaneous crises we are facing.

The existing Sustainability Policy framework is what we have right now to build on and face the triple-crisis and try for a sustainable recovery from the pandemic. In 2015, the UN Agenda 2030 with the 17 Sustainable Development Goals (SDGs) was launched[2], covering of broad range of issues for the planet, people, and their prosperity. Also, in 2015 the Paris Agreement[3], another global agenda to limit the global temperature increase to less than 2°C, was signed by 197 countries. In 2018, the Intergovernmental Panel on Climate Change (IPCC)[4] announced that a 2°C increase is too much and that humanity can only afford +1.5°C compared to pre-industrial levels[5], which implies zero-net emissions globally by 2050.

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[2] United Nations: Transforming our world: the 2030 Agenda for Sustainable Development, 2015. Online available at: https://sdgs.un.org/2030agenda.

[3] Paris agreement. In: Report of the Conference of the Parties to the United Nations Framework Convention on Climate Change (21st Session, 2015: Paris). December 2015, online available at: https://unfccc.int/resource/docs/2015/cop21/eng/10.pdf.

[4] The Intergovernmental Panel (IPCC) is a United Nations inter-disciplinary group dedicated to promoting research on human-caused climate change, see https://www.ipcc.ch/.

[5] IPCC: Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty. Eds. Valérie Masson-Delmotte, Panmao Zhai, Hans-Otto Pörtner, Debra Roberts, Jim Skea, Priyadarsh R. Shukla, Anna Pirani, Wilfram Moufouma-Okia, Clotilde Péan, Roz Pidcock, Sarah Connors, J.B. Robin Matthews, Yang Chen, Xiao Zhou, Melissa I. Gomis, Elisabeth Lonnoy, Tom

In 2019, the United Nations Sustainable Development Solutions Network (UN SDSN) announced six major transformations to achieve the SDGs, in the fields of 1) education, gender and inequality; 2) health, well-being and demography; 3) energy decarbonisation and sustainable industry; 4) sustainable food, land, water and oceans; 5) sustainable cities and communities; and 6) digital revolution for sustainable development[6]. This is an operationalisation framework for the 17 SDGs because 17 goals are too many to be efficient governmental goals. Politicians need fewer goals and they need them in a structure similar to the way that government is.

In December 2019, the European Green Deal (EGD) entered the picture[7], comprising a global leadership example for pathways towards sustainability. The EGD is developed in four general axes: 1) CO_2 neutrality by 2050, 2) European clean-tech leadership, 3) protection of biodiversity and human health and reduction of pollution and 4) just transition, namely an inclusive transition that leaves no one behind. The EGD is accompanied by €1 trillion of a budget to support it. 50% will come from the European Multi-Annual Financial Framework (the EU budget) and the other 50% is aspired to be mobilised by public-private partnerships.

In 2020, the Covid-19 pandemic emerged, which means that flattening the infections curve steepens the macroeconomic recession

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Maycock, Melinda Tignor, and Tim Waterfield. IPCC 2018. Online available at: https://www.ipcc.ch/site/assets/uploads/sites/2/2022/06/SR15_Full_Report_LR.pdf

6 Sachs, Jeffrey D.; Guido Schmidt-Traub; Marina Mazzucato; Dirk Messner; Nebojsa Nakicenovic; Johan Rockström: Six transformations to achieve the sustainable development goals. In: Nature Sustainability, 2(9) (2019), pp. 805-814.

7 European Commission: The European Green Deal. Brussels, 11.12.2019. Online available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1576150542719&uri=COM%3A2019%3A640%3AFIN.

curve and Europe. To deal with this macroeconomic recession, the European Commission established a Recovery and Resilience Facility[8] which amounts to an additional €750 billion to be invested to the recovery of the 27 European Member States.

Despite the Covid-19 outbreak, the vision of the EGD was not lost. On the opposite, this vision was further enhanced due to the recovery fund. Any funds that are going to be derived from Recovery and Resilience Facility should be invested in climate and digital-streamlined investments by 37% and 20% respectively. This is very important, because it identifies the roadway towards the recovery and identifies the structure of the future, namely to build green and digital, but also just societies that will be inclusive and allow everybody to take part in this transition.

The European example of the EGD showed a huge effect on the rest of the world and several countries followed this paradigm. Canada has announced a pact for a Green New Deal, South Korea announced in 2020 a Green New Deal, Israel a Green Recovery Plan and the United States, especially after the election of President Joe Biden, is willing to implement the US Green New Deal. In addition, a significant moment was in September 2020, when China committed to carbon-neutrality before 2060.

The top-down mobilisation of the aforementioned international policies is important, but a bottom-up mobilisation is necessary, too. The EGD includes a Climate Pact[9] where systems are supposed to be transformed via co-design and co-development of stakeholders. All the stakeholders, the business, the policymakers, the politicians, the

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[8] European Commission: Recovery and Resilience Facility, see https://ec.europa.eu/info/business-economy-euro/recovery-coronavirus/recovery-and-resilience-facility_en.

[9] European Commission: European Climate Pact COM(2020) 788 final, December 2020. Online available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2020%3A788%3AFIN

civil society, the non-governmental organisations, the researchers, the technology developers, education and everybody else should co-design a new system to allow change that will be fundamental and will trigger exponential pace towards decarbonisation, biodiversity protection, climate mitigation and adaptation. Thinking linearly only brings incremental changes, but to transform the economic, social and financial systems in a way that will trigger exponential change, a systems-thinking is required. As IPCC explicitly says[10]: "rapid, far-reaching and unprecedented changes in all aspects of society" to face the crisis of climate change and safeguard our way of being.

The UN SDSN has created a Senior Working Group to study the pathways that will allow Europe to implement the European Green Deal with its nine policies: 1) Biodiversity, 2) From Farm-to-Fork, 3) Sustainable Agriculture, 4) Clean Energy, 5) Sustainable Industry, 6) Building and Renovating, 7) Sustainable Mobility, 8) Eliminating Pollution, and 9) Climate Action.

The first report, published in February 2021, constructs pathways[11] that allow the simultaneous implementation of the Sustainable Development Goals, the Paris Agreement, the European Green Deal Policies and the Recovery and Resilience Plans. It identifies technological and political pathways as well as financial portfolios that will support their implementation. At the same time, it sketches out measures for

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[10] Summary for Policymakers of IPCC Special Report on Global Warming of 1.5°C approved by governments — IPCC. (2019). Ipcc.ch; IPCC. Available at: https://www.ipcc.ch/2018/10/08/summary-for-policymakers-of-ipcc-special-report-on-global-warming-of-1-5c-approved-by-governments/

[11] Sachs, Jeffrey; Phoebe Koundouri; et al.: Transformations for the Joint Implementation of Agenda 2030 for Sustainable Development and the European Green Deal - A Green and Digital, Job-Based and Inclusive Recovery from the COVID-19 Pandemic. Report of the UN Sustainable Development Solutions Network. 2021. Available at: https://irp-cdn.multiscreensite.com/be6d1d56/files/uploaded/SDSN_EGD%20Mapping%20Study_2021_final.pdf.

implication for job creation and employment and just transition. The results are at the country level, but also upscale at the European level. They aim at giving politicians and decision-makers a blueprint to facilitate identification of investments and absorption of funds at the national level and to create cross-country alliances for a sustainable recovery. It also facilitates public-private partnerships that will mobilise private resources for the implementation of the EGD. Ultimately, it creates a Climate Pact Manifesto to engage, together with politicians and policymakers, business, the financial sector and civil society (Systems Innovation Approach).

Decarbonisation

Major efforts for decarbonisation are required. Achieving 55% of greenhouse gas emissions reduction requires an additional investment of €350 billion per year in Europe. It's a huge budget but the EGD will support the mobilisation of these funds.

The European Member States stand at different stages with regards to phasing out coal. Some of them, like Estonia, Latvia, Lithuania, Belgium, Malta, Luxembourg and Cyprus, are coal-free. Some others have either committed, or are considering phasing out coal, whereas a number of them, like Poland, Romania, Bulgaria and Croatia, have not yet planned to phase out coal.

In the transition to decarbonisation, we need to identify the technological alternatives to fossil fuels. The European Commission's Annual Sustainable Growth Strategy 2021 includes seven flagships with regards to reforms and investments[12]:

[12] European Commission: Annual Sustainable Growth Strategy 2021 COM(2020) 575 final, 17 September 2020. Online available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020DC0575&qid=1642319648572

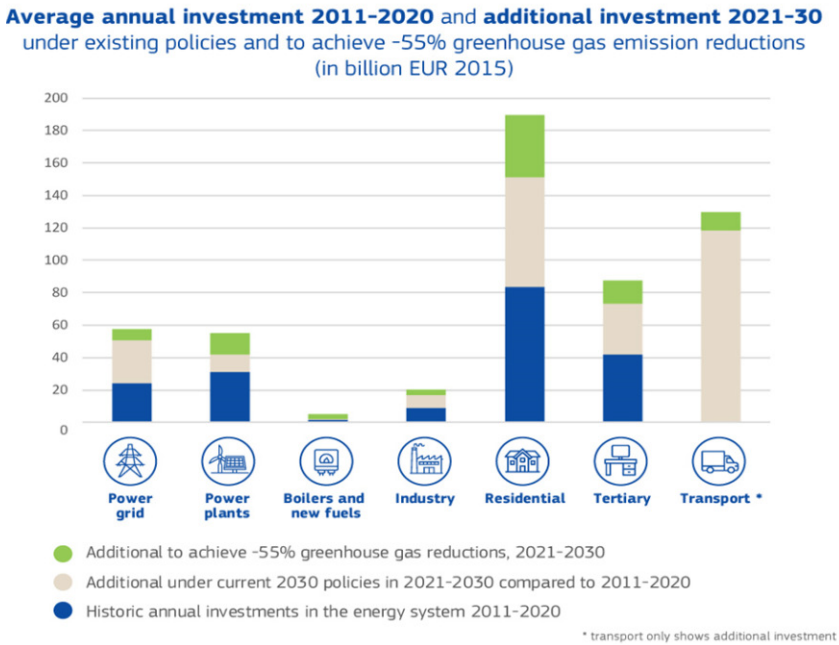

Fig. 1: 2030 energy and climate targets to drive investments across the economy. Source: PRIMES Model[13]

1) Power-up, 2) Renovate, 3) Recharge and Refuel, 4) Connect, 5) Modernise, 6) Scale-up, and 7) Reskill and Upskill. The last one is crucial because the world is not only going through three simultaneous crises, it also goes through the fourth industrial revolution. The rate of technological change is huge and unprecedented. Human skills can be updated at a large pace only if the countries take education, training, reskilling and upskilling aspects of socioeconomic life seriously and invest in it. Most countries need to streamline current

[13] Retrieved from the presentation of webinar: Green transition under the European recovery and resilience facility, Adela Tesarova. Online available at: https://www.youtube.com/watch?v=7RlUmVYzw0s&ab_channel=InterregEurope

education with the needs of the labour market, and then build capacity to have a pace of retraining and reskilling that will keep up with the pace of technological advancement. This is not just an economic aspect. It is a very basic social aspect of the transition, because to have a transition that is inclusive and leaves no one behind, people must be equipped with the capacity to work in the new technological green and digital era.

Drivers for sustainability

There are various drivers for the transition to sustainability. First of all, circular economy is a major driver for cancelling out pollution, using efficiently natural resources and raw materials and optimising waste management. Circular economy is a win-win situation, as it creates savings to businesses, it creates jobs, it reduces the environmental footprint and creates the opportunity of public-private partnerships at all business levels, namely from small and middle-sized enterprises level to multi-national company level.

Another major driver is the climate change adaptation infrastructure. Adaptation programs, such as early warning systems, the resilience of infrastructure, improvement of dryland agriculture and optimal water resources management, generate a triple dividend: avoided losses due to climate change; economic benefits from the investment programs; social and environmental benefits.

Of course, sustainable ways of finance comprise a significant driver, too. All net-zero transition programmes and initiatives need to incorporate measures to counterbalance the regressive effects of decarbonisation policies, while at the same time they should ensure that the financial system is on a pathway towards becoming sustainable. In late 2019, the EU has issued the EU Taxonomy, which helps to the characterisation of projects and investments as being sustainable

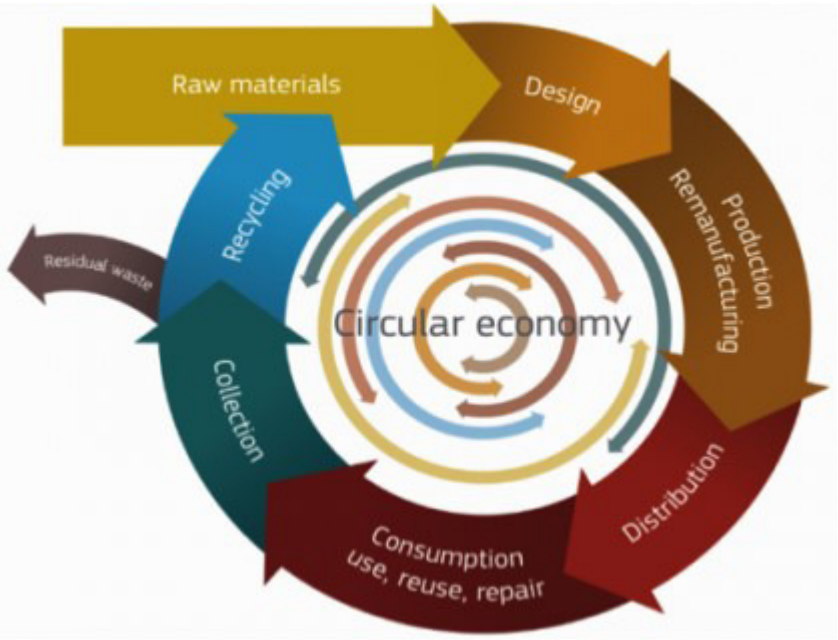

Fig. 2 A circular economy model. Source: O. Ungerman and J. Dědková[14].

or not. At the same time, the European Investment Bank announced that they are not going to fund any unsustainable or fossil-fuel investment anymore. This paradigm was followed by the European Central Bank, The European Bank for Reconstruction and Development, as well as many national and commercial banks. Green bonds are a very effective and easy to use tool to mobilise the transition towards sustainable recovery.

[14] Ungerman, Otakar; Jaroslava Dědková: Model of the circular economy and its application in business practice. In: Environment, Development and Sustainability: A Multidisciplinary Approach to the Theory and Practice of Sustainable Development, 22(4), (2020), pp. 3407-3432.

Lancet Commission Task Force for Job-based Green Recovery

The Lancet Commission for the Covid-19[15], a prestigious commission that includes scientific leaders and practitioners from around the world, aims to identify the pathway towards recovery from the pandemic. Its Task Force for Job-based Green Recovery emphasises the need for a green recovery at the global level to support a transition towards sustainable and inclusive societies, on the pace of the 17 SDGs and the Paris Climate Agreement. Also, the Task Force explicitly states[16] that private investments should be re-oriented towards sustainable industries as well as the digital economy, and should bear complementary private investments. It also stresses the need for an unprecedented commitment to reskilling and upskilling people, mentioning the EGD as a relevant leadership example.

The Alliance of Excellence for Research and Innovation on Aephoria (AE4RIA)

AE4RIA is a collaborative initiative that brings together research institutions, innovation accelerators, and science-technology-policy interface networks with a primary focus on advancing sustainable development. Founded and led by Prof. Phoebe Koundouri, AE4RIA's core mission is to drive a science-driven and human-centric transition towards achieving the SDGs outlined in the UN Agenda 2030,

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[15] https://covid19commission.org/green-recovery

[16] The Lancet Covid-19 Commission, Task Force on Green Recovery: Transforming Recovery into a Green Future, Statement of the Lancet Covid-19 Commission Task Force on Green Recovery, March 2021. Onine available at: https://static1.squarespace.com/static/5ef3652ab722df11fcb2ba5d/t/60a3cae4eff4662023cfc88a/1621347052333/Green+Recovery+TF+March+Statement.pdf

implementing the Paris Agreement on Climate Change, and aligning with the objectives of the EGD.

AE4RIA operates as a dynamic e-network, incorporating various research and innovation centers such as the Research Laboratory on Socio-Economic and Environmental Sustainability (ReSEES) at Athens University of Economics and Business, the Sustainable Development Unit (SD.U) at ATHENA Information Technology Research Center, and the Stochastic Modeling and Applications Laboratory at Athens University of Economics and Business, among others. Additionally, AE4RIA collaborates with a range of innovation acceleration hubs, including BRIGAID Connect Association, MENA Maritime Accelerator, Black Sea Accelerator, SDSN Global Climate Hub, and EIT Climate KIC Hub Greece. Moreover, AE4RIA lends its support to several significant scientific associations and science-policy networks, including the Sustainable Development Solutions Network (SDSN), SDSN Europe, SDSN Greece, the European Association of Environmental and Resource Economists (EAERE), Water Europe, and the NEXUS Cluster.

The Goulandris Natural History Museum

The work done at the Goulandris Natural History Museum[17] is another important private initiative in the effort to tackle the climate crisis. At the moment, there is a three-year programme on climate change and its impact on the planet. The programme is very rich with a series of seminars, events, open discussions, public speeches and conferences, interactive games and interactive exhibitions for young people. So, it's one of the research programmes around Europe but also the richest and most interactive in Greece.

[17] https://www.gnhm.gr/en/home-page/

At the same time, the museum is upgrading GEOSPHERE, a hemispherical dome-monitor showing the rotating planet in high-resolution images, to support educational activities. This is an amazing 3D exposition of the history and the effects of the interaction between humans and nature on each other. Also, the museum hosts the GAIA Centre, a permanent exhibition focusing on the current environmental problems and especially climate change.

At the same time, the Goulandris Museum develops new educational programmes on climate change in collaboration with the UN SDSN and the climate change committee at the Bank of Greece. One of the existing educational programmes, designed for primary school and kindergarten students, is *How we change the climate*, a fairy tale presenting in a very simple way what climate change is. *Climate Change-EARTH* is an impressive projection on the museum's GEOSPHERE presenting global warming, extreme weather phenomena and their effects on man. All the natural catastrophes, except earthquakes, are affected by climate change and their frequency and intensity increase because of it. Young children are experiencing extreme weather events, like floods and wildfires, in their everyday life and they are interested to learn more about it. *Seas and Oceans* is a fairy tale that shows in a very simple way, how great the value of the oceans is for our planet, how they affect climate change and what we can do to protect them. *Oceans & Climate Change*, similar to *Climate Change-EARTH*, is an impressive projection on the museum's GEOSPHERE presenting the importance of the oceans for our planet and consequently for man.