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TACKLING THE CLIMATE CRISIS AND THE CORONA PANDEMIC RECESSION

How central banks can integrate climate finance and stimulating the economy into their regular monetary policy without compromising their primary objectives or losing independency



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Abstract

Today, considerations around climate change impacts is regarded as mainstream among central banks. It has become their mandate because of its threat to their financial stability. However, this finding is yet not reflected in their monetary policies in contrast to other systemic risk situations: For the 2008 financial crisis and the current coronavirus pandemic central banks spent and are spending trillions and multiplied their balance sheets to overcome the threat. This paper will provide new tools (consisting of new Green Bonds and Guarantees) to tackle climate change in an efficient way. Central banks can use the tools without increasing the money supply by reinvesting matured assets from previous purchase programmes. The tools can be integrated in the regular monetary policies of central banks without compromising their primary objectives or affecting their independence. The new tools will also enable central banks to stimulate the economy in a direct way. It will be shown that the necessary amount to meet the 1.5°C limit from the Paris Agreement is only a fraction of the sum used during the other systemic crises. Further, it is estimated that a 37 percent reduction of global CO₂ emissions until 2030 can be triggered only if the ECB operates with the new green bond and guarantees tools annually to the amount of 150bn (which is only 20 percent of their recently announced € 750bn purchase programme to combat the pandemic crisis). If more central banks from the industrialised world will meet their responsibility in this important field, a significant larger effect could be possible. Ultimately, a reduction of all global greenhouse gas emissions to net zero until 2040 is then possible.

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Framing the problem

Today central banks are facing more, and different problems as in the days before the financial crisis from 2008. After overcoming this systemic crisis, the current coronavirus pandemic makes it necessary to restart huge asset purchasing programmes. Only the ECB announced recently a "Pandemic Emergency Purchase Program" (PEPP) worth €750 billion for an immediate tackling of the economic downturn¹. After the establishment of the new central banks and supervisors 'Network for Greening the Financial System' (NGFS) in December 2017, it is clear that the systemic risk resulting from climate change has to be regarded as part of the mandate of central banks. The crucial question now is: Can central banks tackle the pandemic and climate crisis successfully with the same monetary tools which they have used until now or is there a need for new tools?

The traditional main monetary tool – determining the interest rate in the money market – cannot stimulate the economy if the rates are already very low (or even negative). If the overall demand is weak there is no reason for investments in capacity expansion even though interest rates are close to zero. The various asset purchase programs initiated by the CBs led mostly to asset price increases and only slightly - as second round effects - to more investments and employment. If reducing interest rates cannot trigger the economy anymore and purchase programmes could only supply new liquidity, the CBs must find new and more direct tools. These new tools must have the ability to stimulate stable growth on a scale that the CBs can allow positive interest rates, and trigger the inflation rate to the desired level at near two percent.

The crucial next step could and should be giving an answer to the questions: How can CBs help in slow down the climate crisis, as this is the only way to limit the financial risk resulting from climate change on a controllable level? How can CBs support scaling-up the related climate finance to the necessary amount?

In fact, CBs need new monetary tools, which can tackle both problems at the same time: Stimulating the economy

in a direct way in the corona recession and supporting global climate finance on a scale which can stop climate change. In all likelihood, the amount needed to limit global warming at 1.5°C would be much smaller than the amount needed to compensate the financial problems resulting from the Covid-19 pandemic.

1. Climate related financial risk and the mandate of central banks

In his speech in September 2015, 'Breaking the Tragedy of the Horizon' Mark Carney mentioned that climate change would affect financial risk and should therefore be regarded as part of central banks mandate, it was a ground breaking news.² Today, this view would be regarded as central banks mainstream, since almost all relevant central banks of the world (with the exception of the Fed) became a member of the Network for Greening the Financial System NGFS.

The NGFS acknowledges that climate change is part of the CBs mandate, because climate-related risks are a source of financial risk and therefore central banks and supervisors should start integrating climate-related risks into micro-supervision and financial stability monitoring. The NGFS's central banks started their work by finding ways to identify which assets would be at risk through the outcome of global warming and how possible 'green' assets could be privileged compared to fossil fuel assets. The state of the discussion on what this new climate mandate means is now between only a disclosing of the financial risk and the implementation of "green new deal" tools to support financing the global renewable energy transition. In their first comprehensive report from April 2019 the NGFS central banks asserted: "*Climate change is a source of structural change in the economy and financial system and therefore falls within the mandate of central banks and supervisors.*"³

The NGFS distinguished two main sources of financial risk: Physical impacts and transition impacts:⁴

1. "**Physical impacts** include the economic costs and financial losses resulting from the increasing severity and frequency of extreme climate change-related weather

1 cf: ECB press release from 18 March 2020: https://www.ecb.europa.eu/press/pr/date/2020/html/ecb.pr200318_1~3949d6f266_en.html

2 Bank of England; Speech from Mark Carney; Breaking the Tragedy of the Horizon – climate change and financial stability, Lloyd's of London, 29 September 2015; <https://www.bankofengland.co.uk/-/media/boe/files/speech/2015/breaking-the-tragedy-of-the-horizon-climate-change-and-financial-stability.pdf?la=en&hash=7C67E785651862457D99511147C7424FF5EA0C1A>

3 cf: Network for Greening the Financial System, First comprehensive report, A call for action - Climate change as a source of financial risk, April 2019, p. 11. https://www.banque-france.fr/sites/default/files/media/2019/04/17/ngfs_first_comprehensive_report_-_17042019_0.pdf

4 *ibid*; p. 11.

events (such as heat waves, landslides, floods, wildfires and storms) as well as longer term progressive shifts of the climate (such as changes in precipitation, extreme weather variability, ocean acidification, and rising sea levels and average temperatures)."

2. **"Transition impacts** relate to the process of adjustment towards a low-carbon economy. Emissions must eventually reach "net zero" to prevent further climate change. The process of reducing emissions is likely to have significant impact on all sectors of the economy affecting financial assets values. While urgent action is desirable, an abrupt transition could also have an impact on financial stability and the economy more broadly."

A second new institution which addressed the results of these impacts is the "Task Force on Climate-related Financial Disclosures" (TCFD) established in December 2015 by the Financial Stability Board (FSB). The mission of the new TCFD is to "... develop voluntary, consistent climate-related financial risk disclosures for use by companies in providing information to investors, lenders, insurers, and other stakeholders."⁵

However, this mission has thus far proven complex and protracted. In their press release on June 2019 the TCFD stated:⁶ "Disclosure of climate-related financial information has increased since 2016, but is still insufficient for investors." And further: "More clarity is needed on the potential financial impact of climate-related issues on companies."

While the mission of the TCFD is based on the disclosure side of potentially stranded assets, the NGFS also discussed the possible role of central banks in this process. Furthermore, the NGFS mentioned that one of their purposes is to: "mobilise mainstream finance to support the transition toward a sustainable economy."⁷

Climate Change as mandate: The case of the ECB

In the past officials from the ECB repeated injunctions that they had only one "needle in their compass," namely price stability.⁸ In fact, the mandate defined in the EU-Treaties is indisputably wider. In the case of the Eurozone, 'protecting the environment' (which undoubtedly also means protecting against global warming) is part of the mandate of the ECB. Based on article 127 (TFEU), one of the aims of the ECB is to support the objectives of the

EU in article 3 (TEU):

TFEU, article 127: "Without prejudice to the objective of price stability, the ESCB shall support the general economic policies in the Union with a view to contributing to the achievement of the objectives of the Union as laid down in Article 3 of the Treaty on European Union." TEU, article 3, para 3: "(...) and a high level of protection and improvement of the quality of the environment."

There is no reason that purchasing new kinds of green bonds in the amounts necessary to meet the 1.5°C limit would seriously harm price stability. Thus, the primary objective in art. 127 TFEU would not be affected. Also, purchasing new types of green bonds emitted from Development Finance Institutions DFIs or other designated financial institutions by the ECB is not forbidden by art. 127 (TFEU). Therefore, it must be assumed that acting in line with the Paris Agreement is also in line with the mandate of the ECB.

Disclosing potentially stranded assets is not enough

Identifying potentially stranded assets is an important step to tackle financial risk resulting from climate change. It gives investors the necessary information to transfer their investments from fossil fuel related business towards fossil free business, like renewable energies. If there is enough time a smooth transition is possible. But what is the follow up strategy from central banks and supervisors if the disclosed assets in the balance sheets of the companies consist off worthless fossil fuels which never could be burned, and the amount of 'successful' disclosed stranded assets is so huge that the disclosure process itself would trigger a financial crisis?

2. Three reasons central banks should be tackling climate change with new monetary tools

1) The only way to contain financial risk resulting from climate change is to stop it.

Disclosing the countless assets which would be affected by the upcoming physical and transitional impacts, and to allot a specific risk probability to every asset, is a very difficult and time-consuming process. It must be assumed that the benefits from this process to spur a global

5 cf. Task Force on Climate-related Financial Disclosures: <https://www.fsb-tcf.org/about/#>

6 FSB press release from June 5 2019; <https://www.fsb-tcf.org/wp-content/uploads/2019/06/Press-Release-FSB-2019-TCFD-Status-Report.pdf>

7 cf. NGFS, April 2019, p.7

8 cf. Honohan, Patrick; Should Monetary Policy Take Inequality and Climate Change into Account? In: Peterson Institute for International Economics; Working Paper 19-18, October 2019, p.7. <https://www.piie.com/sites/default/files/documents/wp19-18.pdf>

renewable energy transition are too little and too late for meeting the 1,5°C goal. But not meeting this goal will increase the climate related financial risk on an uncontrollably level. To contain the financial risk on a manageable scope stopping climate change at 1.5°C is absolutely necessary. Avoiding every further delay is crucial. To accelerate the energy transition new monetary tools consisting of guarantees and grants had to be designed. A further challenge for central banks is to provide a prudential plan for a 'last exit strategy' for the affected fossil fuel companies to change their investments from fossil fuels to renewable energies.

2) Central banks needed a new "going direct" monetary tool, which is necessary for the next crises

The absence of a monetary tool which can stimulate the economy in a direct way is criticised since the 2008 financial crises from many observers. Various QE or 'helicopter money' proposals have been discussed since then. Today also conservative institutional investors proposed such a 'going direct' way.⁹ And also the new corona pandemic recession of the global economy demands for a direct tool urgently. The below described new monetary tools (chapter 4) to accelerated the renewable energy transition would provide such a 'going direct' possibility, because they would trigger a huge amount of new investment in the industrialized world as well as in the Global South.

3) Central banks can foster stable prices if they support a substitution from volatile fossil fuels to stable renewable energies

In the past, one of the main problems for central banks in controlling the inflation rate was the strong and erratic fluctuation of the energy prices of oil, coal, and natural gas. In contrast the prices for renewable energies decreased in a continuous manner over the last decade. Renewable energy (RE) systems can produce electricity at much more stable prices as any fossil-fuel based energy generation and will therefore prevent strong fluctuations in (energy) prices. Supporting a fast RE-transition would therefore also help a central bank to fulfil its mandate in stabilising the price level. A delay in scaling

up renewable energies will lead to an increased continuing of burning fossil fuels and to a permanent rise of the related prices if peak oil, coal and gas come into effect. Central banks would come under pressure to tackle this stable price increase with a tight monetary policy and losing scope to support a sustainable growth of the economy.

3. The problem of sufficient bankable projects in the field of global climate finance

The announcement of the NGFS to support mobilising mainstream finance for a transition toward a sustainable economy is an important step. However, the realisation of this plan needed the existence of enough bankable projects. And much in contrast to the many announcements about increasing green finance, global RE-investments have stagnated since 2011, at around \$300bn per year.¹⁰ The bulk of that investment happened in high income countries and China while only a very small part was invested into renewables in the Global South.¹¹

The main barrier to more RE-investments in the Global South is not a lack of (green) investment capital, but rather a lack of bankable projects.¹² A basic condition for any investor to engage in the energy sector is the upfront investments needed for the power plants, and different (perceived) risks, such as technological or regulatory risks associated with policy interventions such as subsidies. Despite the absence of any fuel costs for many renewable energy sources, the required capital investments for renewable energy technologies remain an important barrier.¹³ As long as many potential investment risks are unknown and the predictability of stable revenues is uncertain a strong scaling-up of global renewable energy investments will remain difficult.

The currency mismatch problem: repayment in reserve currencies whilst revenues are in local currency

To reach the goals set by the Paris Agreement a major part of the new RE-investments had to take place in the Global South. This means in the most cases an increase

9 cf. BlackRock Investment Institute; Dealing with the next downturn, August 2019

<https://www.blackrock.com/corporate/literature/whitepaper/bii-macro-perspectives-august-2019.pdf>

10 cf. FS - UNEP; Global Trends in Renewable Energy Investment 2019, p.21 <https://wedocs.unep.org/bitstream/handle/20.500.11822/29752/GTR2019.pdf?sequence=1&isAllowed=y>

11 cf. Climate Finance Leadership Initiative; Financing the Low-Carbon Future, September 2019, p.29 https://data.bloomberglp.com/company/sites/55/2019/09/Financing-the-Low-Carbon-Future_CFLI-Full-Report_September-2019.pdf

12 cf. IRENA; Scaling up renewable energy investment in emerging markets, 2018, p.3 https://coalition.irena.org/-/media/Files/IRENA/Coalition-for-Action/Publication/Coalition-for-Action_Scaling-up-RE-Investment_2018.pdf

13 cf. OECD, UNEP, World Bank Group; Financing Climate Future, 11/2018, p.24 <https://www.oecd-ilibrary.org/docserver/9789264308114-en.pdf?expires=1570716710&id=id&accname=guest&checksum=8B35EA9C980F72FFB3C87174F0FF2BC7>

of imports (for the RE equipment) from the industrialised world into the less industrialised countries. And this leads to a currency mismatch if the imported RE equipment must be financed in an international reserve currency while the revenues of the sold new renewable electricity would be in the respected local currency. This mismatch is a further obstacle for a renewable energy transition in the Global South.¹⁴

New monetary tools which can address the mentioned problems and trigger a fast scaling-up of renewable energies are yet to be developed.

4. A modest proposal to reduce global CO2 emissions: New types of green bonds and guarantees for tackling climate change

Even though central banks declared climate change as part of their mandate, their engagement in climate finance measures is far from being anywhere near the level of engagement during the 2008 financial crisis or the current pandemic recession. To avoid the systemic risk resulting from a meltdown of the economy, central banks purchased trillions of financial assets and multiplied their balance sheets largely for a permanent time horizon. Today, the necessary financial efforts for central banks to avert the climate crisis are estimated as much less. Central banks of the industrial world could purchase virtual perpetual Green Climate Bonds in the needed amount of several hundred billion dollars per year without getting in trouble (risk of inflation, stability of banking system etc.). If they substitute matured assets (from previous purchase programs) through these new types of green bonds they would not even affect the scale of the money supply.

It is only a small last step from purchasing 'normal' Green Bonds from public financial institutions (what e.g. the ECB has already done in the amount of €48bn)¹⁵ to also purchasing 'virtual perpetual' Green Climate Bonds from public financial institutions. If a group of relevant central banks from the industrialised world agreed to buy this

type of bonds, then sufficient sums to push global climate finance (and breaking climate change in that way) could be generated.

The ECB has announced that they had already purchased green bonds from the public sector. Now the ECB and the other central banks has just this small step further and purchase also green bonds with very long-term maturity. Very long-term maturity means that DFIs or other designated financial entities which issued the new green bonds could use the received money in form of a grant (and not only as a loan), because there is virtually no need for a repayment.¹⁶ Also backing guarantees is then possible.

Re-investing matured assets from CSPP and PSPP in new designed perpetual 'non-financial' green bonds

One the first glance the re-investment of 'normal' assets after maturity into 'non-financial' assets with no financial returns can be regarded as system change. However, earning money from holding assets is only a minor side-effect for a central bank. If a central bank will purchase 'non-financial' assets to fulfil its mandate of tackling climate change to limit the related financial risk it can be regarded as a 'indirect financial' asset purchase. Also, the NGFS mentioned in its first comprehensive report that the purchase of 'non-financial' assets with sustainability goals is basically an option:

"Central banks may decide to employ part of their investments to pursue non-financial sustainability goals in order to generate positive (societal) impacts, in addition to traditional financial return goals. In this way, central banks can also actively support the development of the market for green and sustainable assets."¹⁷

A 'climate bailout' by re-investing matured assets

Only the ECB expected a need for a re-investment of matured assets in 2020 in an amount of €258bn mostly from CSPP and PSPP.¹⁸ In this modest proposal it will be suggest that an amount of €150bn from the total re-investments will be used for a yearly 'Sustainable Climate Asset Purchase Program' (SCAPP) until 2030. This

14 World Future Council/Global Renewable Congress; Climate Finance - Policy Brief, Leveraging climate finance for the Global South, January 2020; <https://www.renewablescongress.org/2020/01/policy-brief-on-leveraging-climate-finance-for-the-global-south-context-and-tools-a-brief-overview/>

15 Cf. European Central Bank, Economic Bulletin, Issue 7/2018 p.26. <https://www.ecb.europa.eu/pub/pdf/ecbu/eb201807.en.pdf?224d7c18a6757e6369b6b881cbff054e>

16 There are different regulations on the longest maturity of an asset in the balance sheet of a central bank (e.g. 30 years). To convert an e.g. 30 years asset into a virtual 'perpetual' asset these regulations had to be adjust, or the related central bank could agree to revolve the 30 year asset at the end of maturity to a next 30 year term in an informal way.

17 Up to now the NGFS discussed this topic only for the case of their own-portfolio management. Cf. NGFS, April 2019, p.28.

18 cf. ECB 2020: <https://www.ecb.europa.eu/mopo/implement/omit/html/index.en.html>

SCAPP should be divided in three monetary tools of new 'non-financial' green bond assets to finance the 'climate bailout'. The central banks (in this case the ECB) could back guarantees and purchase virtual perpetual, 'Standardised Green Climate Bonds' which are issued from different Development finance institutions (DFIs) or from other designated financial institutions.¹⁹ A further tool should be used to offer fossil fuel companies a 'last exit' strategy from fossils to renewables.

4.1. Guarantees

The lack of reliable risk calculation methods especial for countries of the Global South often locks access to funding, despite the potential profitability of the RE project itself. An approved roadmap however, could identify promising RE-investments, including potential credit guarantees from the DFIs which would help de-risking the investment. Since DFIs alone can only cover a very small fraction of the risk, central banks should cover the bulk of the risk of the guarantees. Thus, the DFIs create a new standardized, low risk and low interest asset category which could be issued to private institutional investors, the Central Bank backed Climate Bonds (CBBCBs). The guaranteed assets issued by DFIs and backed by central banks would transform the RE-investment into a low risk, long-term and sustainable investment. The guaranties of the central banks justify interest rates at the low level of AAA government bonds. This low interest level would unlock a huge amount of additional RE-Investments. The low interest level leads to lower investment costs and thus can be used to sell the newly produced renewable electricity at a price which makes it 'affordable for all' (in line with the SDG 7).²⁰ Central Banks would only become involved in the case of a default e.g. when project development fails.

In this proposal for the ECB a sum €65bn is assumed to provide DFIs a kind of perpetual credit line if a CBBCB defaulted. Because, it can be assumed that only a small part of the CBBCBs will be affected by a default a large leverage effect of the assumed €65bn should be possible.

4.2. Standardised Green Climate Bonds (SGCBs)

If a RE-investment needs not only a guarantee to gain profitability, but a one-time or permanent grant, the involvement of central banks must increase. In this case the DFIs or the other designated financial institutions would issue standardised and virtually perpetual Green Climate Bonds to central banks of industrialised countries which have agreed to purchase also new "non-financial sustainable goal assets". The Standardised Green Climate Bonds establish a new class of 'non-financial' assets, for central banks, as only they have the ability to purchase interest free and virtually perpetual bonds. The new capability of the DFIs to receive new and virtually repayment-free money by issuing the 'non-financial' Standardised Green Climate Bonds to the central banks opens new possibilities for massive expansion of their concessional window to fund many new RE-Investments through using blended finance mechanisms and involve institutional investors.

In this proposal it is assumed that the ECB will purchase SGCBs worth €65bn annually until 2030. Also, here a large leverage effect can be assumed.

4.3. Convertible Climate Bonds (CCBs)

Today many big companies are in the possession of fossil fuels which can never be burned if we want to meet the 1.5°C limit. If a company with too much fossil fuels in their balance sheet, which probably become stranded, wanted to change their business model toward greater sustainability, central banks together with DFIs or other designated financial institutions can offer a 'last exit' strategy.²¹ The central bank and the financial institutions should first determine an amount of 'Convertible Climate Bonds' (CCBs) to finance the last exit option. In the next step the designated financial institution can offer to purchase potential stranded fossil fuel assets if the selling companies will provide a precise investment plan to build new and additional renewable energies with the received money. The DFI will then purchase the assets from that company, which provides the best offer in terms of saved fossil fuels, new installed capacity and expected

19 cf: World Future Council; Financing 100% Renewable Energy for all in Tanzania, Climate Finance – Policy Brief, 6/2018, p.4 ff. https://www.worldfuturecouncil.org/wp-content/uploads/2018/07/Financing-100RE-For-All-In-Tanzania_Matthias-Kroll_06-2018.pdf

20 World Future Council; Unlocking the trillions to finance the 1.5°C limit, Future Finance Policy Brief, 11/2017, p.3 ff. https://www.worldfuturecouncil.org/wp-content/uploads/2017/11/WFC-Policy-Brief-09_2017-Unlocking-the-trillions_Merged-Version-1.pdf

21 This plan is an enhanced version of the World Future Council, Policy Brief 02/2018: How to convert fossil fuel stranded assets into renewable energy investments; <https://www.worldfuturecouncil.org/wp-content/uploads/2018/02/Stranded-Assets-Climate-Bailout-Plan-02-2018.pdf>

GWh renewable energy per received money.²² The DFI must ensure that the investments are new and additional and would not supplant other renewable energy investments.

If a central bank purchase CCBs it would become the owner of worthless fossil fuels because they never can be burned. However, in a longer term, the central bank can sell the fossil raw materials to companies which want to use this material for a non-energetic use, fostering circular economy principles. This would give these CCBs at least small financial returns. In this proposal, it is assumed that the ECB will buy €20bn of the CCBs per year.

5. Integrating the new monetary tools into the regular monetary policy of central banks without compromising their primary objectives or losing independency

By integrating the new tools into the existing monetary policies, a number of challenges could occur. How can we ensure that the new tools are market neutral? What will happen when a central bank wants to reduce their balance sheet to absorb liquidity and a bulk of the existing assets had a virtual perpetual maturity and can't be sold because they are interest free?

5.1. The market neutrality of not reinvesting the matured corporate bonds into new corporate bonds

The ECB expected matured corporate bonds (from the CSPP) for 2020 in an amount of €16.3bn which is small in relation to the matured bonds from the public sector.²³ The discussion on market neutrality develops, because many observers criticised the central banks for purchasing also bonds from the fossil fuel related industry. The central banks justified their behaviour by arguing that they had to act in a market neutral way and favouring a 'green' bond in contrast to a 'brown' bond would not be market neutral. But if a central bank will re-invest all matured corporate sector bonds in the above mentioned SCAPP no company will be discriminated. Operating a SCAPP is market neutral and will deteriorate the finance conditions for the related companies only very slightly. Critics could argue that by supporting a global renewable energy transition a central bank would also support the related renewable industry and discriminate the fossil

fuel related industry in that way. This is obviously true, but if a central bank will fulfil its climate-mandate they cannot do this by supporting fossil fuels.

5.2. What happens when matured public bonds are not reinvested in new public bonds?

If the ECB substitutes a large part of the €201.5bn matured government bonds from the PSPP²⁴ by re-investing €150bn in the previously mentioned three new types of green bonds more government bonds will remain in the market. If there is now other substitution from the central bank this would lead to a slightly increase of the interest rates for government bonds. If the ECB wanted to avoid such slightly increase, she can again start a suited purchase program for public bonds. An increase of government bonds in the market gives a central bank more leeway for possible further government bonds purchases if the economy steps into the next crisis (like now) and needed a new stimulus (e.g. by the new €750bn PEPP from the ECB).

5.3. Why 'non-financial goal' SCAPPs will not hinder central banks to operate their usual monetary policy?

If a central bank will use one or all three new types of green bonds they will not lose their main monetary tool, the ability to determine the interest rates in the money market and to route the interest rates in the bond markets in the desired direction. Further they can continue to purchase bonds from the public and the corporate sector in order to provide liquidity or to assist the governments by handling the public debt. If the Central bank wanted to reduce liquidity, she can sell assets to the market or – the traditional textbook way – increase the reserve requirements. The central bank can continue to use all these tools in an independent way. There are no hidden backdoors for governments to limit this independence resulting from using the aforementioned SCAPP. By using the new tools, the central bank will work closely together with several DFI or other financial institutions to a degree which is controlled by herself. The central bank will decide on the scale of the used tools even if it would decide to apply a monetary tool for several years (e.g. a yearly €150bn SCAPP until 2030).

22 It could be argued that a fossil fuel company which wanted change their business model can sell the problematic fossil assets to other fossil fuel companies which wanted to continue with burning fossil fuels. But the climate objective has to be to stop burning them. This result can only provide if a central bank is the new owner of the fossil fuels and will remain the fuels in their balance sheet.

23 cf: ECB 2020: <https://www.ecb.europa.eu/mopo/implement/omt/html/index.en.html>

24 cf: ECB 2020: <https://www.ecb.europa.eu/mopo/implement/omt/html/index.en.html>

Handling an enduring block of SCAPP assets in a central banks balance sheet

In an ideal central bank's world, their balance sheets would consist of a plenty of reserve currencies and high-rated and liquid domestic assets. This would give the central bank the ability to regulate the money supply in an easy way. In the real world with an endogenous money supply the things are slightly more complicated.²⁵ However, the behaviour of the central banks after the financial crisis has indisputably proven: The amount of the central bank balance sheet is irrelevant for the development of the broader monetary aggregates like M1 or M2 and the inflation rate. The old money multiplier story does not explain the real behaviour of the banking system.²⁶ This leads us to the conclusion that a central bank can also handle with an inflexible block of 'non-financial' assets like the assets from the SCAPP, because their relevant main monetary tools will not be affected.

Solving a potentially currency mismatch resulting from the SCAPP

If a relevant group of NGFS central banks will use the new ('going direct') tools the economy will be stimulated one a global level. In the industrialised world, because most of the new RE equipment will be manufactured in these countries, countries from the Global South will benefit, because they gain a new renewable energy system in a scale and velocity which would otherwise not be possible. And they could save foreign reserve currencies, as imports from fossil fuels will no longer be necessary. During this process it could be that central banks will purchase green bonds in line with the SCAPP, but the production of the new RE equipment will take place in another country from the industrialised world. To solve the resulting currency mismatch central banks which are members of the NGFS can agree to treat the three new types of bonds (CBBCBs, SGCBs and CCBs) as an exchange surrogate between each other and offset potential currency mismatches in that way.

6. Why is supporting large scale climate finance also a job for central banks and not for the public budget alone?

Some central bankers like Deutsche Bundesbank president Jens Weidmann rejected all responsibility from cen-

tral banks for tackling climate crisis by purchasing green bonds, because they have no democratic mandate for that.²⁷ But this problem can be solved if the parliament declared to approve the new climate mandate and the related tools e.g. the purchase of different sorts of green bonds.

We need a mutual agreement (formal or informal) between the governments (and/or the parliaments) and their central bank. The government should give a sign to the central bank that it is in line with the CB's opinion that tackling climate change and the related support for blended climate finance is in their mandate. This would give the central bank the certainty that their action is not against the democratic will of the parliament and in return the Parliament would not harm the independence of the central bank.

This mutual agreement will enable the financial means which are urgently needed to fund the global energy transition. There are undoubtedly good theoretical reasons that this sort of financial support should to come from the government alone. But in the real world, it is of little hope that national budgets will deliver any significant amount to cover the huge sum required. Experience from the last 30 years of climate finance has proven that governments could not deal with the tasks resulting from climate change, because the most negative effects will occur decades after their term. And there is no time left waiting for a change of this behaviour. Today, central banks are the most powerful economic institutions. Power means responsibility. Central banks are able to support their countries by overcoming the threats of climate change without compromising their primary objectives or losing their independence. They should do whatever is necessary to avert this threat.

7. Reducing global CO2 emissions: only if the ECB will re-invest €150bn of matured bonds in a SCAPP: A short estimation

This short estimation will assume that from the total €258bn²⁸ matured assets that had to be re-invested a sum of €150bn will be used to re-invest in the different sorts of green bonds described in chapter 4.

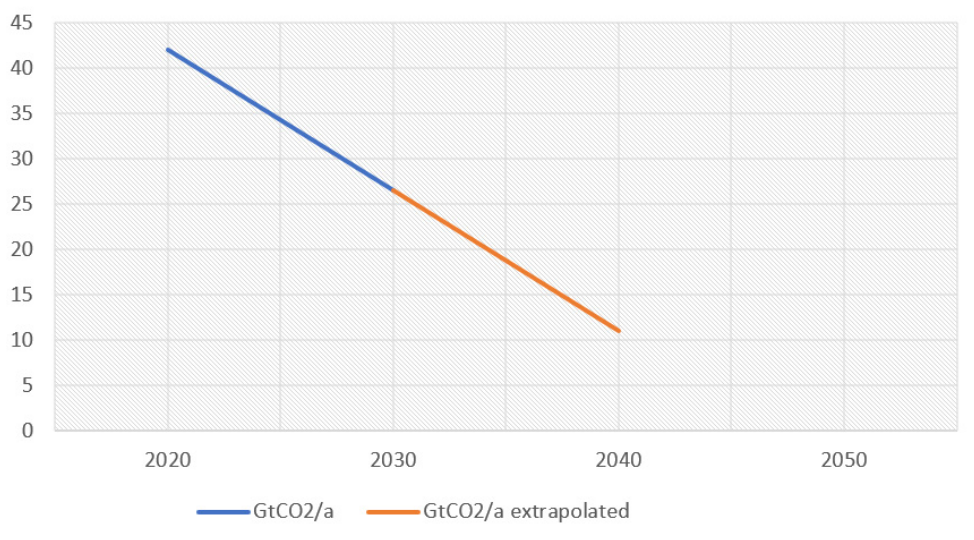
25 Cf. World Future Council; The meaning of the endogeneity of money for the different kinds of QE and large scale financing of the SDGs, Future Finance - Discussion Paper 06/2018; <https://www.worldfuturecouncil.org/wp-content/uploads/2018/06/Financing-Green-Climate-Fund-06-2018.pdf>

26 Bank of England; Quarterly Bulletin 2014 Q1, Volume 54, No. 1, p.15 <https://www.bankofengland.co.uk/-/media/boe/files/quarterly-bulletin/2014/quarterly-bulletin-2014-q1>

27 cf. Deutsche Bundesbank, 29.10.2019; <https://www.bundesbank.de/en/press/speeches/climate-change-and-central-banks-812618>

28 cf. ECB 2020: <https://www.ecb.europa.eu/mopo/implement/omi/html/index.en.html>

Global CO₂ reduction in Gt/a until 2030 by using the supposed purchase programs from the ECB



The distribution of this new re-investment would need to be as follows:

- €65bn for the re-investment in Standardised Green Climate Bonds (SGCB)
- €65bn for backing the Central Bank backed Climate Bonds (CBBCB)
- €20bn for re-invest in Convertible Climate Bonds (CCBs)

The general idea to use the reinvestment for these new sorts of green bonds is to blend this new money with private capital from institutional investors and trigger a much greater total investment in renewable energies (RE). However, there are differences in the effectiveness of the new bonds and therefore the different leverages must be estimated. Despite little experience with such kinds of bonds an approximate estimation of the respective leverage can be given.

In this short study the estimations for the sharing of the €150bn and the different leverages are following:

- €65bn for the implementation of the SGCBs with a leverage of ten.
- €65bn for the implementation of the CBBCBs with a leverage of five
- €20bn for the implementation of the CCBs with a leverage of two

This leads to new annual renewable energy investments in total of €1,015bn respectively about \$1,150bn. If we use a slightly exploration from the 2018 figures of the FS-UNEP report on global renewable energy investments of the relation of RE-Investments in US-Dollar to the implemented RE-investment in GW a current relation of \$1.5bn/GW can be assumed.²⁹

Using this relation, we get around 770 GW for \$1,150bn. If we use the reported Gigawatt shares of 2/3 solar and 1/3 wind³⁰ and 1,600 full load hours for solar and 3,000 full load hours for wind³¹ we will

get 1,592 TWh fossil free generated with new installed renewable energy.

This short estimation uses a simplified assumption that only existing coal fired power plants will be substituted by the new renewable energy.³² Given an average degree of efficiency from 35 percent for the power plants and a factor of 0.34 KgCO₂/kWh for the used coal³³ an amount of 1.55 Gt CO₂ could be saved by the new fossil free generated renewable energy per year. Until 2030 the global CO₂ emission can be decreased from 42 Gt today to 26.5 Gt.

This estimate demonstrates that with relatively low sums the ECB can trigger a reduction of 37 percent of the global CO₂ emissions until 2030. However, the results depend on the assumed leverage factors. Further research on these questions is surely needed. But if these estimated factors are higher than expected the ECB could easily reduce their investment on the desired level. If the factors don't reach the estimated numbers, the ECB could also increase their green bond purchases. In any case a strong co-operation between (at least) the NGFS central banks should be aspired to. If more central banks would fulfil their new climate mandate in this efficient way the goals of the Paris Agreement could be reached in time.

29 Frankfurt School-UNEP Centre/BNEF. 2019. Global Trends in Renewable Energy Investment 2019; <https://wedocs.unep.org/bitstream/handle/20.500.11822/29752/GTR2019.pdf>

30 Ibid: p.26

31 cf. IRENA (2019), Renewable Power Generation Costs in 2018, International Renewable Energy Agency, p.19 ff; https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2019/May/IRENA_Renewable-Power-Generations-Costs-in-2018.pdf

32 A more elaborate estimation should be considered that also oil and natural gas power plants would be substituted by the new fossil fuel free renewable energies. In this case the amount of saved CO₂ would be slightly smaller. This effect could be compensated by the further decreasing costs from the renewable energies, because more RE can be installed with the same amount of investment money.

33 Quaschnig, Volker; Spezifische Kohlendioxidemissionen verschiedener Brennstoffe; <https://www.volker-quaschnig.de/datserv/CO2-spez/index.php>

Conclusion

This short study concludes that the amount of CO₂ emissions could be reduced by 37% until 2030 if only the ECB will use a part of their scheduled reinvestment for supporting global climate finance. This can be regarded as part of their mandate and will not affected their ability to operate the regular monetary policies in an independent way. If more central banks from the industrialised world will meet their responsibility in this important field a significant larger effect could be possible. A reduction of all global greenhouse gas emissions to net zero until 2040 is then possible.

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Dr Matthias Kroll is Chief Economist - Future Finance at the World Future Council. He studied political economics, sociology and law at the Hamburg University for Economics and Politics and graduated as a certified political economist. In a postgraduate course he worked with an interdisciplinary approach on scientific-methodological questions and on the issue of regenerative conversion of the communal energy supply. Dr Matthias Kroll was engaged in the set-up of an environmental management consultancy, however soon returned to academics in order to gain a PhD in financial theory and politics. In doing so he dealt with the question on how public expenses can be financed through the money generation of the central bank without creating inflation. Matthias taught economic policy at the University of Hamburg. Since 2010 he works on Future Finance Commission for the World Future Council.

About the World Future Council

The World Future Council (WFC) works to pass on a healthy and sustainable planet with just and peaceful societies to our children and grandchildren. To achieve this, we focus on identifying, developing, highlighting, and spreading effective, future-just policies for current challenges humanity is facing, and promote their implementation worldwide. The Council consists of 50 eminent global change-makers from governments, parliaments, civil societies, academia, the arts, and the business world. Jakob von Uexkull, the Founder of the Alternative Nobel Prize, launched the World Future Council in 2007. We are an independent, non-profit organisation under German law and finance our activities from donations.

