World Future Council

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Financing the 1.5°C limit

How central banks can contribute to climate finance by purchasing perpetual and non-interest-bearing Green Climate Bonds

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Abstract:[1]

At the COP 21 in Paris, the international community agreed on an agenda to cut greenhouse gas emissions to a level that will limit the rise in average global temperatures to 1.5°C. On 5 October 2016, the threshold for entry into force of the Paris Agreement was achieved. For a likely chance to stay below a rise of 1.5C, we have to reach zero emissions by 2050. This is not a choice, but a matter of survival, as the impacts of climate change already threaten human lives and ecosystems around the world. Actual policies currently in place continue to fall short of limiting global warming to 1.5C. A recent UNEP report found that even if every country that made an emissions-cutting pledge in the Paris Agreement keeps its promise, the world would still fall short of keeping temperature rise below 2 degrees Celsius over preindustrial levels. The individual commitments would only keep warming below 3 degrees at best, the report finds. Meanwhile, nations are on course to further miss the mark of the Paris Agreement's more ambitious pledge to "pursue efforts to limit the temperature increase to 1.5 Celsius above pre- industrial levels" by 15 to 17 gigatons per year. Thus we need to scale up and accelerate the move towards 100 percent renewable energy.

The question remains: how are we going to finance the fundamental transformation needed to reach this goal? The International Energy Agency has established that $1tn per year of renewable energy investments would be needed to stay below the 2C limit.[2] Thus, to achieve the 1.5C limit agreed in Paris, substantially higher investments will be required. A first rough estimation puts this figure between $1.5tn and $2tn. This number is much larger than the once promised $100bn per year to the new Green Climate Fund of the UNFCCC. And even the yearly achievement of the $100bn from 2020 seems unlikely.[3] Using private capital for climate finance is only possible if there is already sufficient financial return to cover interest and reimbursement costs of the provided credits. But the bulk of the needed RE-Investments have - under the current conditions - too little commercial profitability for dealing with private credits. Thus, one way to accelerate RE-Investments would be to improve economic conditions by using grants from public money (e.g. for debt guarantees or feed-in tariffs). However, to match public grants with private capital we would need yearly sums considerable larger than 100bn from national budgets, which still seems very questionable. Especially since previous experiences with getting financial commitments from taxes or semi-public funds – such as from emissions trading – also tell us that the sums provided regularly fall short of what has been promised.

An alternative way of financing and providing sums larger than $100bn dollars in form of grants (not loans) could be the involvement of central banks. **They** can never become insolvent in their own currency due to their monopoly of issuing the legal tender – even if they purchase non-performing assets. The economic potential of central banks was witnessed during the bank bailout, leaving no apparent reason why they should not contribute to saving the climate with a fraction of the funds previously used. In order to do this, central banks would continue doing what most of them are currently doing to combat the effects of the financial crisis: Buying bonds to create new liquidity. To support climate finance, central banks would need to buy standardized "Green Climate Bonds" issued by the Green Climate Fund (GCF), Multilateral Development Banks (MDBs) or other dedicated financial institutions which are involved in climate finance.

[1] This paper based on the study 'Financing the Green Climate Fund' proposed by the World Future Council firstly in April 2016

[2] Cf. Figueres, Christina in The Guardian of 14.1.2014, http://www.theguardian.com/environment/2014/jan/14/un-climate-chief-tripling-clean-energy-investment-christina-figueres

[3] Cf. The new 'Roadmap to US$100 Billion' from the industrialized countries from October 2016. http://dfat.gov.au/international-relations/themes/climate-change/Documents/climate-finance-roadmap-to-us100-billion.pdf.

By doing so, central banks would finance concrete RE-Investment projects, rather than investing in government or corporate bonds. The monetary policies of the central banks would benefit from this new liquidity to finance real production instead of simply purchasing existing financial assets. So, instead of talking about “QE for the banks” we should focus on “QE for the climate”.

This new monetary finance tool to influence the economy in a direct way gains even more importance because the old policies from the central banks have lost their power during the times of combating the financial crisis.

Standardized Green Climate Bonds should be perpetual and interest free. Due to their perpetual duration, Green Climate Bonds would become permanent assets of the central banks and thus form the foundation of regular money creation. This would ensure that the GCF or the MDBs are at the receiving end of new and non-repayable money with which it can increase the profitability of many existing climate protection investments. Likewise, it is now possible to finance adaptation and mitigation measures that result in no immediate economically exploitable yield. Considering the current behaviour of central banks up to $300 billion could easily be found within the regular money creation process.

Ideally, all UNFCCC member states and their central banks should be involved in this new Green Climate system. The financing via standardized Green Climate Bonds could also be initiated through the participation of a relevant number of members. The advantage for states participating in the bond purchases would be that Climate Bonds purchased by their central banks would count towards their promised share of the $100 billion, without having to invest their own budget funds.

For the real economy, such additional demand (on RE-Infrastructure and the related consume) would not lead to inflation since it will be globally distributed. Even if new money creation succeeds in stimulating total investment and thus an additional demand of up to $2 trillion (including participated private capital), this would be a small stimulus package rather than an inflationary risk when seen in relation to the global economic output of around $80 trillion dollars.

The proposed study would demonstrate how new money flows between the GCF and MDBs as bond issuing institutions and the central banks can finance the global transition to a renewable energy economy while supporting monetary policy objectives at the same time.

1. The challenge

Since the beginning of the financial crisis, central banks have first bailed out private sector banks and, then, states by buying up private and public bonds to the tune of billions. This was possible because central banks can never become insolvent in their own currency due to their monopoly of issuing the legal tender – even if they purchase non-performing assets. An important side effect of these bailouts was the growing realisation that central banks can play a more active role with their monetary policies. If money creation by central banks does not automatically lead to inflation, newly created money can be used to finance urgent global tasks that would otherwise not be undertaken, e.g. underfunded global climate protection measures. It is still unclear how conventional financing sources can provide the minimum $100bn per year which we are told are needed for the Green Climate Fund, in order to attract further investment from the private sector.

To still achieve the 1.5°C limit, approximately $1.5 to 2 trillion needs to be invested per year for climate protection- in economically sensible ways. For a successful leveraging to a grand total of up to $2tn per year, a basis of at least $300bn is more realistic than the hitherto agreed up to $100bn. But even $300bn is not such a huge amount when compared to the world output (the appropriate comparison) of approximately $80tn. Compared to the sums that are now being injected into the financial system by central banks, $300bn per year would cause neither excess demand nor inflation.

2. The possible role of central banks in climate financing

Central banks have the task of providing their currency area with sufficient legal tender. This means that in ordinary times (with a real growth rate of 2% and an inflation rate of 2%, i.e. nominal growth of 4%) they can meet demands for additional money of up to 4%, without this money creation leading to imbalances or speculative bubbles. An expansion of the money supply analogous to the real financing needs of a growing economy is naturally sustainable.[4]

To meet additional demand for money and inject it into the economy, central banks give- usually very short term-credit to banks or buy government or private bonds of differing maturities from them. During ordinary economic times there is likely to be nominal monetary expansion and growth in central bank assets. Central banks can afford to additionally include very long-term bonds in their balance sheets without it constraining their (monetary) room for manoeuvre. This means that it is possible to integrate the purchase of long-term Green Climate Bonds (issued by the GCF or dedicated MDBs) into the money creation process without it requiring a fundamental change of central bank policy. The current independency of central banks would not be affected by such a new “QE for climate” programme.

[4] It was unsustainable to provide for the financial sector’s enormous demand for money for speculative purposes since the deregulation of the financial sector. But central banks could not stem excess demand for credit without simultaneously throttling growth- given that they only had the setting of lending rates as their sole policy tool.

If we assume that future, nominal, global growth will average 5%, the yearly global growth of the money supply must also be around 5% to avoid restrictive effects on the real economy. The two biggest central banks, the US Federal Reserve and the ECB, could (with $5tn as their total monetarily effective balance sheet total[5] and a long-term money creation requirement of 5%) potentially create $250bn per year without causing inflation and could use this to purchase perpetual Green Climate Bonds. As the dollar and euro currency zones together account for only 36% of global GDP, the total sustainable money creation potential of all central banks can be estimated at $700bn.[6] The purchase of Green Climate Bonds for the assumed total of $300bn would still give central banks enough scope to continue their normal monetary operations with the policy measures already in use. A buffer of approximately $400bn dollars could be created to offset possible shortfalls on the part of other central banks.

As shown by the massive interventions by central banks during the financial crisis, central banks can expand their balance sheets with once-off purchases of assets of all types - without relevant negative consequences. This means that a once-off purchase of Green Climate Bonds, exceeding the usual extent of monetary expansion, would be possible. This money could be used as start-up financing for many climate protection projects.

Standardized 'Green Climate Bonds' as a new monetary tool of central banks

When central banks buy new Green Climate Bonds, and record this in their balance sheets, they also gain a new monetary policy tool. The advantage of this new tool is that it leads directly to the purchase of new goods and services. The real economy is thus stimulated without a need for the usual detour of credit creation by private banks. This means that no new debtors and creditors need be found. The new money is created, debt-free. The disbursal by the GCF and the MDGs would be directly into the system of the nation's banks, and their reserves at the central bank would rise. Should excess reserves result, the banks could reduce these reserves by lowering their refinancing at the central bank. The money supply would thus fall again. Banks would reduce their reserves at the central bank, which they do not need to refinance credit creation, and thereby reduce the money supply, because of the endogeneity of the money supply.[7] The Bank of England has recently identified this as the correct description of monetary policy practice.[8]

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[5] Thanks to the various measures used by central banks to manage the financial crisis, their balance sheets became volatile. The figure of 5 tn $ is to be seen as a rough average. Cf. the current amounts in the ECB's monthly review and the Federal Reserve's Statistical Release, H6.

[6] For a preliminary estimate of the sum involved, it is assumed that the balance sheet of other central banks are structurally similar to those of the ECB and the Federal Reserve.

[7] cf. World Future Council (2016): The meaning of the endogeneity of money for 'conventional QE' and the different kinds of 'helicopter money', Future Finance – Discussion Paper 11/2016.

[8] cf. Bank of England: "Money creation in the modern Economy", in: Quarterly Bulletin, Vol. 54, No. 1, 2014, Q1. http://www.bankofengland.co.uk/publications/Documents/quarterlybulletin/2014/qb14q102.pdf The bulk of the theory on endogenous money supply was generated from the mid 1980's. Important contributions came from P. Howells and Thomas Palley. See also Moore, Basil J.: Horizontalists and Verticalists: The macroeconomics of credit money, Cambridge, 1988; Howells, Peter: The demand for endogenous money, in: Journal of Post-Keynesian Economics Vol. 18, No. 1, 1995, p. 89-196; Palley, Thomas: Post Keynesian Economics: debt distribution and the macroeconomy, 1996

The effect of the endogeneity of the money supply is especially important when central banks buy more Green Climate Bonds (for a short period of time as start up financing) than needed for actual money creation. This process contributes to the money creation and the resultant money supply reduction offsetting each other, so that the money supply grows as much as the economy requires to expand to full potential.

When a central bank puts a perpetual Green Climate Bond in its books to use as collateral for money creation, it meets the requirement of James Tobin[9] and Richard Musgrave[10], that government bonds should be the bedrock of central bank assets. As the Green Climate Bonds issued by a supranational public institution, they have a comparable function to national government bonds. The purchase of Green Climate Bonds could thus not only be integrated into the currently practised monetary policy measures of central banks, but also into classical financial theory.

The traditional task of central banks was seen as quite narrow before the financial crisis. Besides providing the economy with legal tender, managing inflation was emphasised. With the financial crisis, and the phenomenon of deflation, this has changed radically. Central banks have been compelled to use all their economic tools to stem the crisis. They have been given a larger area of responsibility for the overall stabilization of the financial system. The Bank of England has now stated explicitly that the risk to the stability of the financial system from climate change is a new responsibility of central banks.[11] The purchase of standardized Green Climate Bonds would therefore be the consistent next step for a central bank policy fulfilling its mandate.

3. What distinguishes the new Green Climate Bonds from ordinary bonds?

An ordinary bank or an institutional investor who buys a bond wants to earn interest and be repaid the capital in full at maturity. The business model using ordinary bonds can work in a market economy only if the issuer of bonds can generate that interest and the repayments due in the real economy. Because Green Climate Bonds are not actually repaid and do not yield interest, the only feasible buyers are central banks. Due to their right to issue legal tender (in their own currency), central banks cannot become insolvent and remain capable of acting even if they have negative capital.[12] When a central bank purchases bonds, it does not do that to earn interest[13], but to provide the seller of the bond with money and thus boost liquidity in the economy. Thereby, the central bank fulfils the function as issuer of legal tender. A central bank does not rely on interest payments, nor on the bond being repaid at a certain date. It can absorb bonds with

[9] cf. Tobin, James: An essay on principles of debt management, Fiscal and debt management policies; quoted from the German edition. Baden-Baden, 1978, p. 121.
[10] cf. Musgrave, Richard Abel: Theory of Public Finance; quoted from the German edition. Theorie der öffentlichen Schuld, in: Handbuch der Finanzwissenschaft, Dritter Band, Tübingen, 1958. p. 136
[11] cf. Bank of England, One Bank Research Agenda, Discussion Paper, 25. February, 2015, p. 30 ff.
[12] Jordan, Thomas; Braucht die Schweizerische Nationalbank Eigenkapital; Rede vor der: Statistisch Volkswirtschaftliche Gesellschaft, Basel , 28. September 2011
http://www.snb.ch/de/mmr/speeches/id/ref_20110928_tjn/source/ref_20110928_tjn.de.pdf
[13] When a central bank buys bonds from ordinary banks in order to inject liquidity, it naturally earns respective interest. That is also a large part of the contribution of profitably for central banks. It is, however, not the proper job of a central bank.

unlimited terms into its balance sheet. As long as it keeps enough stocks and bonds with short terms and/or those it can sell on the market, it can again reduce the newly created money at any time. From a monetary policy perspective, the central bank remains fully capable of acting.

4. The Green Climate Finance System: How do the new financial streams flow?

To involve the central banks in the financing of the required $100bn – or better yet: 300bn, a new Green Climate Finance System is needed. This entails the participating member states of the UNFCCC allowing their central banks to invest in standardized Green Climate Bonds of the GCF or other financial institutions which are involved in climate finance on a perpetual basis. It is unnecessary that all member states of the UNFCCC take part. To ensure the fundamental functioning of the system, it would suffice if Annex 1 nations and well-performing Annex 2 nations (that have an internationally recognised currency and/or a positive current account) take part. That might not immediately enable the issuing of the full required amounts. But it would provide tens of billions annually to fund climate protection investments. The more states take part in the Green Climate Finance System, the larger the sum available. An important incentive for UNFCCC members taking part would be that the bonds (purchased by their central banks) would be recorded as funding for the GCF. A government taking part in this system could therefore fund the GCF without using its own budget.

It would also be sensible to have an agreement (between central banks taking part in the system) to recognise standardized Green Climate Bonds as tender between them. In that way, exchange rate fluctuations could be reduced whenever demand for specific currencies and corresponding buying central banks do not coincide.

The Green Climate Finance System at work

Before the GCF or MDBs sells these new Green Climate Bonds to central banks, it needs to determine which climate protection projects are to be funded - and to what extent. Only then can it be known which currencies will be needed. When this is established, the GCF or the MDBs sells new Green Climate Bonds of this amount to the respective central banks. The central banks record the new bonds in their balance sheets and issue the new currency to the GCF or the MDBs. The funding of projects will normally be distributed among several central banks. Most Green Climate Bonds are likely to be bought by central banks of Annex 1 countries. But central banks of Annex 2 countries (that have a surplus in their current account and/or large currency reserves) could also buy new Green Climate Bonds. Where a direct purchase of Green Climate Bonds is legally tenuous because of the central bank's mandate - as probably with the ECB - an investment bank can be used as intermediary. For the ECB, the European Investment Bank (EIB) could be used. The new Green Climate Bonds would then be sold to the EIB, which would sell them on to the ECB.

Who profits (and how) from the new financial flows from Annex 1 to Annex 2 countries?

The new funding, which the GCF or the MDBs obtains from Green Climate Bonds, can be channelled in various ways to fund climate protection measures. For example, an industrial consortium of international and local project operators wants to generate CO2-free energy in an Annex 2 country with a combined solar and wind power infrastructure.

In this example it is assumed that the investment project would need – based on projected electricity prices - a 30% start-up funding to be economically feasible. That means that a total investment of $1bn would need funding of $300m from the GCF or the MDBs. Because the project is then profitable, the balance of $700m can be obtained from investors. To obtain the funds, the project operators would need to lay out to the GCF or the MDBs exactly which currencies they would need to obtain the investment goods (probably mostly from Annex 1 countries). The cost of construction in Annex 2 countries would be covered by way of the GCF or the MDBs selling the necessary bonds to a pool of Annex 1 countries' central banks. Thus, central banks would finance, with the new money and via the Green Climate Finance System, additional exports from Annex 1 states. The newly created money would have a positive effect in the issuing country while also providing foreign exchange in the recipient country.

This is a simplified example to illustrate the fundamental financial flows. Other funding models are possible. The overriding principle would still be "money only for performance". Other funding models, where investment projects in RE plants would involve a guaranteed payment for supplying electricity, are thinkable. Regardless of the funding model chosen, the Green Climate Finance System will give Annex 2 countries a currency influx from Annex 1 states, while Annex 1 states get export financing. In the system described, the GCF and the MDBs will acquire additional responsibility for the distribution of considerably increased funds.

Summary

With the new Green Climate Finance System, sums of $100bn to $300bn p.a. can be channelled to the GCF, the MDBs or other dedicated financial institutions which are involved in climate finance in the course of ordinary money creation by central banks. Already in the start-up phase, before the participation of all UNFCCC member states, funding of tens of billions of dollars worth of projects would be possible. A new Green Climate Finance System would benefit an array of groups:

- the countries in which the climate protection investments take place (mostly Annex 2 states) get new energy generation systems which give the poorer part of the population access to energy, and with which the country can substitute imported energy. Simultaneously, they obtain additional currency flows that would usually require additional exports.
- the commercial enterprises that carry out the projects
- institutional investors get a new, long-term investment option with solid and certain returns.
- the countries where the technical equipment for climate protection projects is manufactured boost their exports and increase employment. They can also contribute to the GCF without needing to burden their budgets.
- through the massive expansion of renewable energy generation, a considerable amount of CO2 is saved.

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