A new age of energy inflation:

climateflation, fossilflation and greenflation[1]

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Europe and the world are facing a watershed moment.

As the human tragedy in Ukraine unfolds before our eyes, surging commodity prices are pushing inflation in many countries to the highest levels in over 40 years, calling for a step change in energy policy.

Today, our dependence on fossil energy sources is not only considered a peril to our planet, it is also increasingly seen as a threat to national security and our values of liberty, freedom and democracy.

Accelerating the transition towards renewable energies is the task of the hour considering these threats. Every solar panel installed, every hydropower plant built and every wind turbine added to the grid are taking us a step closer to energy independence and a greener economy.

Renewable energies are "freedom energies", as German finance minister Christian Lindner recently put it. New technologies and facilities for renewable energies are an investment in our future.

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[1] Text of a speech at a panel on "*Monetary Policy and Climate Change*" at *The ECB and its Watchers XXII Conference,* Frankfurt am Main, 17 March 2022

Already today, the cost of electricity from renewable sources is significantly lower than that of conventional power plants.[1] Further technological advances mean that, by 2040, even the costs of small photovoltaic systems can be expected to be lower than those of any fossil fuel power plant.
And once energy demand can increasingly be met with renewables, households will benefit from lower electricity prices.

The transition to this new steady state will not come for free, however.[2]
There is a price to be paid for going green at a pace that reflects the dual objective of safeguarding both our planet and our right to self-determination. But that price, including the fiscal support required to protect the most vulnerable members of society, is worth paying.

As we build a more sustainable economy, we face a new age of energy inflation with three distinct but interrelated shocks that can be expected to lead to a prolonged period of upside pressure on inflation.

The first shock is linked to the costs of climate change itself, or "climateflation".

As the number of natural disasters and severe weather events is rising, so is their impact on economic activity and prices. For example, exceptional droughts in large parts of the world have contributed to the recent sharp rise in food prices that is imposing a heavy burden on people who are struggling to make ends meet.

The second shock, "fossilflation", is to blame for much of the recent strong increase in euro area inflation. In February, energy accounted for more than 50% of headline inflation in the euro

area, mainly reflecting the sharp increases in oil and gas prices (Slide 2).

Fossilflation reflects the legacy cost of the dependency on fossil energy sources, which has not been reduced forcefully enough over the past decades. In 2019 petroleum products and natural gas still accounted for 85% of total energy use in the euro area.[3] The fight against climate change is one factor that is contributing to making fossil fuels more expensive, and hence their environmental damage more visible.

In the European Union, the price of carbon remains measurably above pre-pandemic levels despite recent elevated volatility (Slide 3, left-hand side). In addition, many institutional investors in financial markets have started to materially reduce their exposures to fossil fuel energy producers, leading to increased funding costs and contributing to the sluggish response of crude oil production in large parts of the world (Slide 3, right-hand chart).[4]
Yet, an overwhelming share of the recent rise in gas and oil prices over and above their pre-pandemic levels – their "excess" rise – reflects the ability of energy producers to steer supply in an oligopolistic market (Slide 4, left-hand side). Oil and gas markets are often artificially tight, pushing up prices at the expense of energy importers, such as the euro area.

Embargos on Russian oil imports imposed by the United States and the United Kingdom as well as the European Commission's plan to reduce Russian gas imports by two-thirds by the end of the year mean that fossilflation, and its broader repercussions on other input and output prices, is likely to remain an important contributor to headline and underlying inflation in the foreseeable future.

A marked decline of fossil energy prices, as indicated by current futures prices, seems rather unlikely from this perspective.

The effects of the third category of shocks, “greenflation”, are more subtle.

Many companies are adapting their production processes in an effort to reduce carbon emissions. But most green technologies require significant amounts of metals and minerals, such as copper, lithium and cobalt, especially during the transition period.

Electric vehicles, for example, use over six times more minerals than their conventional counterparts.[5] An offshore wind plant requires over seven times the amount of copper compared with a gas-fired plant.
No matter which path to decarbonisation we will ultimately follow, green technologies are set to account for the lion’s share of the growth in demand for most metals and minerals in the foreseeable future.[6]
Yet, as demand rises, supply is constrained in the short and medium term. It typically takes five to ten years to develop new mines.

This imbalance between rising demand and constrained supply is why the prices of many critical commodities have increased measurably in recent months. The price of lithium, for example, has increased by more than 1000% since January 2020 (Slide 4, right-hand side). Export restrictions on Russian commodities may add to pressure on prices over the near term.

These developments illustrate an important paradox in the fight against climate change: the faster and more urgent the shift to a

greener economy becomes, the more expensive it may get in the short run.

So far, greenflation has had much less of an impact on final consumer prices than fossilflation. It is therefore misleading to claim that the greening of our economies is to blame for the painful rise in energy prices.

But as more and more industries switch to low-emission technologies, greenflation can be expected to exert upward pressure on prices of a broad range of products during the transition period.

Monetary policy cannot ignore the green transition

How monetary policy should respond to these price pressures has become the subject of intense debate.

Concerns have been voiced that monetary policy could slow down, or even stand in the way of, building a less carbon-intensive economy should it react to higher energy price inflation by removing monetary stimulus. After all, interest rates directly affect the cost of capital and hence the incentive to invest in greener technologies.

Two concrete proposals have been put forward as to how central banks could continue to look through higher energy price inflation, even if it contributes to a prolonged period of inflation above our 2% target.

Both proposals, however, come with important shortcomings.

Increasing the inflation target

The first proposal is to raise the inflation target.

It suggests internalising the inflationary impact of the green transition by moving central banks' goalposts. A higher target would automatically reduce the need for policy adjustments.

Last year, as part of our monetary policy strategy review, we carried out an in-depth assessment to determine the optimal inflation target for the euro area. There were arguments in favour of raising the target.

In particular, given the secular decline in the real equilibrium interest rate, a higher inflation target may help increase the available policy space by reducing the time central banks have to spend at the effective lower bound, thereby improving the ability of monetary policy to stabilise the economy in the face of a disinflationary shock.

The case against a higher inflation target was based on three main points.

First, there is considerable uncertainty as to whether the secular decline in real interest rates will continue in the future.

In fact, the significant need for private and public investment associated with the green transition itself is a reason to believe that real interest rates may rise from their subdued pre-pandemic levels. The energy transformation alone will require a doubling of global annual investments (Slide 5).

Europe's ambition to limit its dependency on global value chains in several areas of strategic importance will raise these investment needs further, while higher productivity growth in the wake of the digitalisation of our economies and an aging society that increasingly runs down its accumulated savings may add to upward pressures on real interest rates.

Second, a higher inflation target increases the costs of inflation, which are likely to be non-linear. The current environment vividly demonstrates the burden on the population from higher inflation rates.

Third, if central banks decided to move their goalposts when they fail to achieve their target, they would almost certainly lose credibility and public trust. It would create expectations of future adjustments and thus seriously undermine the anchoring role of any numerical target.

So, just as central banks have not succumbed to pressure to lower their inflation targets in the face of a series of disinflationary shocks in the decade before the pandemic, they should be careful in raising their target at a time when the green transition holds the potential to loosen the binding constraint of the zero lower bound and to lower energy prices over the long run.

This is not to say that inflation targets can never be adjusted. They may well be changed if there are good and robust reasons to do so.[7] The fight against climate change, however, is unlikely to be one of them.

Excluding energy prices from central banks' measures of inflation

The second proposal suggests setting the direction of monetary policy with a narrower focus on measures of underlying or core inflation that exclude more volatile items such as energy.

There are two main problems with this idea.

First, central banks typically look at exclusion-based measures to distinguish signal from noise. Exclusion-based measures often remove the most volatile items – prices that fluctuate a lot are not that relevant for inflation in the medium term.

The green transition is likely to turn this argument on its head when it comes to energy.

It calls for a different treatment of energy prices precisely because changes in these prices may become less symmetric during the transition, with imbalances in the energy and mineral markets limiting price movements to the downside.

An inflation index that ignores a persistent increase in the relative price of energy is a misleading indicator of underlying inflation trends.

Second, there is a reason why most central banks worldwide, including the ECB, focus on headline inflation – it is a comprehensive measure that best represents households' expenses and thus provides the best guide for fully and effectively protecting their purchasing power.

Permanently excluding items from this index is to a large extent an arbitrary decision: why, for example, exclude energy and not travel-related expenditure, the contribution of which to the HICP has also been highly volatile in recent years? After all, energy

accounts on average for around 10% of total consumption expenditure in the euro area. For households with lower incomes, the share is often markedly higher.

As with raising the inflation target, ignoring persistent trend increases in the price of energy would ultimately serve to undermine trust and confidence in our determination to protect price stability.

This does not mean that the concept of underlying inflation will become less relevant for the conduct of monetary policy in the future. It just has to be defined differently.

Trimmed mean measures, for example, offer more flexibility than exclusion-based indices as they include all items but attach less weight to those that have highly volatile prices (Slide 6, left-hand side).[8] The Persistent and Common Component of Inflation (PCCI) measure is another alternative. It exploits the cross-sectional variation of all inflation components.[9]
A major benefit of the PCCI is that it also captures the impact of more persistent shocks to food and energy, while rightly putting less weight on short-lived price effects of categories that are part of more traditional exclusion-based measures, such as the aforementioned travel-related expenditures.

During the pandemic, the PCCI has signalled an increase in underlying inflation earlier than other measures, in part reflecting the broader repercussions of the increase in energy prices.

What monetary policy can do during the green transition

Overall, therefore, monetary policy cannot simply ignore the effects of the green transition if they threaten to jeopardise the achievement of our primary mandate of price stability.[10] Already today, we are seeing that firms are passing on higher energy costs to final consumer prices, thereby contributing to a notable broadening of price pressures (Slide 6, right-hand side).

Such indirect effects of higher energy prices can be a persistent source of upward pressure on underlying inflation. They are not a one-off price shock that policymakers can simply look through, in particular when pipeline pressures are continuing to build up, like today.

Nominal rigidities, long-term supply contracts and global value chains imply that the lags with which higher input prices are passed on to consumers are long and variable. In many countries, for example, the recent strong increase in wholesale gas prices is yet to be passed on to households, while new shocks related to the green transition will likely add over time to current and past price pressures.

All this means that when it comes to advancing the green agenda, fiscal policy needs to remain in the driving seat, as we stressed in our recent monetary policy strategy review. It is essential that the euro area's revised fiscal framework creates space to frontload and speed up public investment in green infrastructure and technologies.

Fiscal policy also has an important role to play in buffering the current supply shocks. However, these measures need to remain consistent with advancing the green transition. They should be targeted towards protecting those suffering the most from higher

energy prices, while retaining, as much as possible, incentives to reduce carbon emissions.

That said, the ECB can, and will, do three things to support the green transition.

The nature of the shock matters for policy

First, the distinction I made earlier between climateflation, fossilflation and greenflation matters for the conduct of monetary policy.

Climateflation and fossilflation share many of the characteristics of both an adverse supply shock and a terms of trade shock. They require a finely balanced policy response.

On the one hand, prudence is needed in order to minimise the negative impact that a change in the course of monetary policy could have on aggregate demand at a time when the economy is suffering from higher energy and food prices. This is even more true in light of the uncertainty that Russia's invasion of Ukraine implies for confidence and aggregate demand in the euro area.

On the other hand, even when considering this uncertainty, the current inflation outlook is no longer consistent with the exceptional policy measures we took to fight very low inflation. An end of net asset purchases in the third quarter of this year, as we currently expect, will still leave our overall policy stance highly accommodative.

In this environment, prudence may also come at a cost: a reaction function that differs materially from that of other central banks

facing a protracted period of above-target inflation risks amplifying the energy price shock by weighing on the exchange rate, thereby adding to the burden on real household income.

Since June of last year, Brent crude oil prices have increased by around 45% in US dollar terms but by more than 60% in euro terms (Slide 7, left-hand side).

Therefore, as we announced at our meeting last week, monetary policy normalisation in the euro area will proceed, but it is going to be gradual and conditional on the war in Ukraine not weighing on medium-term inflation.[11] Only signs of a deanchoring of medium to long-term inflation expectations from our target would justify a more forceful policy response.
We have not yet seen this in the euro area, but we are carefully monitoring the recent rise in long-term market-based measures of inflation compensation to levels above 2% (Slide 7, right-hand side).

By contrast, greenflation is much more likely to be the result of a strong and persistent positive demand shock, or investment boom, that re-establishes the "divine coincidence" of monetary policy – that is, the ability of central banks to stabilise inflation and output simultaneously.

In other words, once the nature of the shock changes, and the more benign price effects of the green transition start to dominate, the trade-off for monetary policy becomes less relevant.

Greening the operational framework

Second, the ECB will continue to green its monetary policy framework.

Our goal is to ensure that our set of instruments is aligned as much and as soon as possible with the Paris objectives. In practise, this means that among the instruments that we consider equally effective, we will choose the ones that also contribute to the EU's environmental goals.

At present, there are still considerable operational impediments.

In particular, there remain competing definitions and disclosure standards, which delays efforts to properly identify climate-related risks. Many banks, for example, do not yet effectively differentiate between green loans and other loans, making a green TLTRO difficult on a practical level.[12]
Overcoming these impediments is a daunting task. But the ECB will actively contribute to work that can accelerate change, acting where possible as a catalyst to progress on that front.

Aligning our instruments with the Paris objectives does not necessarily mean that we have to wait until we launch new policy action. Take our corporate bond holdings as an example.

We are currently holding around €380 billion of corporate bonds on our balance sheet, mostly under the asset purchase programme (APP). While we intend to reinvest, in full, maturing securities for an extended period of time after policy rate lift-off, we can change the structure of our bond portfolio even when keeping the size of the portfolio unchanged, or when we start to reduce the size of our balance sheet.

In other words, while the degree of policy accommodation, and hence the size of our bond portfolio, is solely determined by monetary policy considerations, we could actively tilt our portfolio towards the Paris objectives once we have decided on how the market neutrality principle, which is currently guiding our bond purchases, should be modified.

As I argued previously, if markets misprice the risks associated with climate change, an allocation according to the market neutrality principle may not favour an efficient allocation of resources.[13]

Greening financial markets

Third, we need to strengthen our joint efforts to green financial markets.

Monetary policy is a demand-side policy that varies with the business cycle. It cannot provide structural support to the green transition. Any policy operation must first and foremost serve a monetary policy purpose.

Financial markets are different. They can provide a permanent platform to help channel finance towards greener and more sustainable projects, provided the externalities of climate change are clearly and distinctly visible, which they are not yet today.

Central banks can help build this platform. We have an important role as a catalyst in the financial industry. Our collateral rules, for example, have the potential to define the standards governing interactions across all financial market participants. An asset that

is penalised in our operations will also face higher refinancing hurdles in the market.

As a way of example, the Eurosystem could impose a limit on the volume of assets from high emitters that counterparties can mobilise as collateral at any moment. Over time, such changes can be expected to affect the entire collateral pool held by Eurosystem counterparties.

Growing empirical evidence suggests that the efforts made by us and other institutions to green financial markets are showing first results.

The green bond market is growing at fast speed. And recent analysis by ECB staff finds that for green bonds that are externally reviewed either through second-party opinion, certification or verification, there exists a “greenium” – that is, a premium investors are willing to pay for a green bond – and that this premium has started to become statistically significant over time (Slide 8).

A financial market that better internalises the significant costs of climate change will provide strong incentives for green investment, even when monetary policy is normalising.

Conclusion

Let me conclude.

The recent measurable increase in euro area inflation, and the upward pressure on prices that can be expected to prevail over

the near term, is a strong reminder of the urgency with which we need to accelerate the green transition.

Moving away from fossil fuels as fast and as forcefully as possible will not come without costs, however. The measures that are needed to support the people of Ukraine and to protect both our planet and the right of free societies for territorial integrity and independence will herald a new age of energy price inflation. Navigating through this episode will require solidarity and political cooperation at all levels: global, European and national.

Monetary policy will play its role in this transition. It will protect the purchasing power of people by ensuring that the current protracted period of high inflation will not become entrenched in expectations, while remaining supportive of growth and employment.

We will align our policies with the Paris objectives as quickly as possible, so that all the actions we take in the pursuit of our primary mandate will contribute to the greening of our economies and not undermine incentives to accelerate the green transition.

And we will reinforce efforts to green our operational framework and work towards measures that strengthen the role of financial markets in providing the capital needed to build a more sustainable economy.

1. This refers to the "levelised cost of electricity", which is a measure of the average net present cost of electricity generation for a generating plant over its lifetime. See Frauenhofer Institute for Solar Energy Systems (2021), *Levelized Cost of Electricity – Renewable Energy Technologies,* June.
2. See also Pisani-Ferry, J. (2019), "The case for green realism", *Opinion*, Bruegel, 7 March.

3. European Central Bank (2022), "Natural gas dependence and risks to euro area activity", *Economic Bulletin*, Issue 1.
4. For example, the International Energy Agency called on investors to stop funding new fossil fuel projects to reach net zero emissions by mid-century.
5. International Energy Agency (2021), *The Role of Critical Minerals in Clean Energy Transitions*, May.
6. See also Valckx et al. (2021), "Metals Demand From Energy Transition May Top Current Global Supply", IMFBlog, 8 December.
7. For an excellent review, see Diercks, A. M. (2019), "The Reader's Guide to Optimal Monetary Policy".
8. Trimmed mean measures have also been found to be better predictors of headline inflation, including in the euro area, see e.g. Brischetto, A. and Richards, A. (2006), "The Performance of Trimmed Mean Measures of Underlying Inflation", *Research Discussion Paper,* 2006-10.
9. Bańbura, M. and Bobeica, E. (2020), "PCCI – a data-rich measure of underlying inflation in the euro area", *Statistics Paper Series*, No 38, ECB.
10. Schnabel, I. (2022), "Looking through higher energy prices? Monetary policy and the green transition", remarks at a panel on "Climate and the Financial System" at the American Finance Association 2022 Virtual Annual Meeting, Frankfurt am Main, 8 January.
11. See also Lagarde, C. (2022), "Monetary policy in an uncertain world", speech at "The ECB and its Watchers XXII Conference", Frankfurt am Main, 17 March.
12. See Elderson, F. (2022), "Full disclosure: coming to grips with an inconvenient truth", keynote speech at the 14th European Bank Institute Policy Webinar, 14 March. And Van 't Klooster, J. and van Tilburg, R. (2020), "Targeting a sustainable recovery with Green TLTROs", September.
13. Schnabel, I. (2021), "From market neutrality to market efficiency", welcome address at the ECB DG-Research Symposium "Climate change, financial markets and green growth", Frankfurt am Main, 14 June.