

# A response to Jonathan Aldred: On the tortuous relationship between GDP and macroecological footprints

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**Abstract:** This article responds to [Jonathan Aldred's \(2026\)](#) claim that returning high-income economies to within planetary boundaries need not require a reduction in GDP. Drawing on cases recently celebrated as evidence of green growth – notably Romania and Ireland – it argues that headline instances of absolute decoupling dissolve under scrutiny once recessions, reforestation, consumption-based accounting, multinational distortions of national income, successive GDP-vintage revisions, and the full set of planetary boundaries are taken into account. Using the IPAT identity to frame the transition as a choice between accelerating efficiency (decoupling) and contracting throughput (degrowth), the paper contends that the actions required to respect ecological limits are very likely to shrink GDP, because the less nature-intensive alternatives to polluting goods and services are also less GDP-intensive. It further argues that degrowth need not slow the ecological transition but can accelerate it: by freeing up labour, materials, and energy, a planned contraction makes real productive capacity available for green investment, so that degrowth becomes a biophysical precondition for selective green growth. The article closes by reframing the degrowth–green growth opposition at the level of policy, mobilising the Avoid–Shift–Improve framework to argue that sufficiency and efficiency are complementary, sequenced routes to reducing macroecological footprints rather than rival ones.

## Introduction

Is decoupling happening, yes, or no? And if not, could it ever happen? Over the course of a few weeks, *The Guardian* published several pieces on the topic that may appear contradictory, arguing both that “economic growth [is] no longer linked to carbon emissions” and that “economic growth is still heating up the planet.”<sup>1</sup> This is perfect timing because the *Cambridge Journal of Economics* just published a stimulating article on the subject: “[Degrowth as climate policy: From GDP to consumption reduction](#)” (2026) by [Jonathan Aldred](#), an Official Fellow and College Lecturer in economics at the University of Cambridge. I’ll take this paper as a point of departure to argue – like I’ve done several times before on this blog – that the green growth hypothesis is overblown.

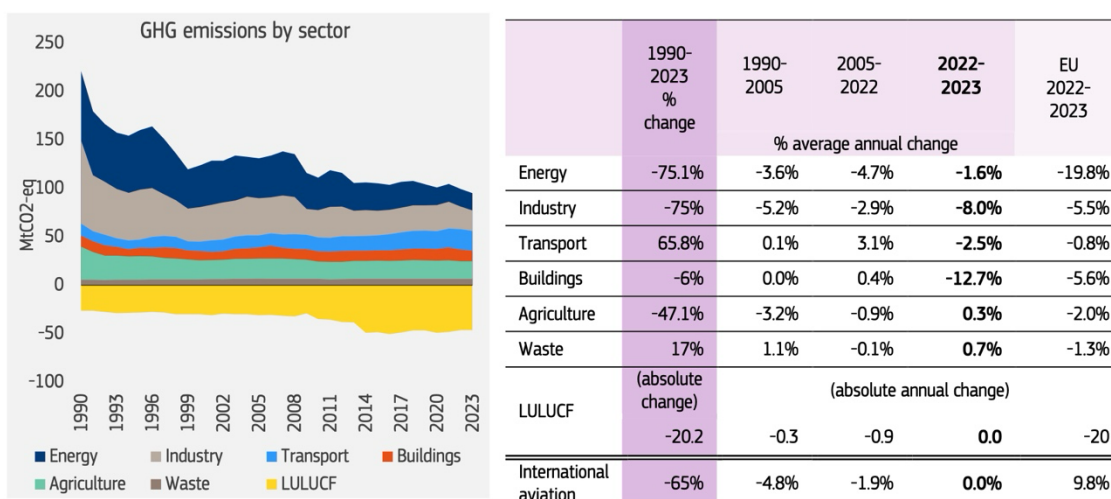
## No miracles here

I hate to be a bird of ill omen but there seems to be some kind of mass hysteria going on about decoupling. Take [The Guardian’s piece on Romania](#), which is as bombastic as it gets. A “breakneck transformation” that “shattered the link between economic growth and high emissions,” achieving

decoupling, “the holy grail of the energy transition.” The article reports that greenhouse gas emissions plunged by 75 % between 1990 and 2023, reaching 3 tonnes per person, the second lowest in Europe.

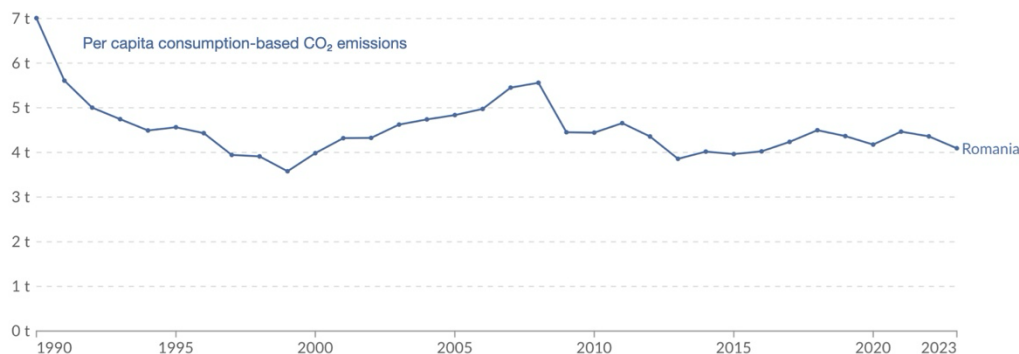
This looks like a miracle, but is it? I’ve never studied the case of Romania but a rapid look at the numbers is enough to realise that it is not a green growth heaven. First, most cuts in emissions occurred during periods of recession, which looks more like degrowth than green growth.<sup>2</sup> Emissions were cut in half when the communist regime collapsed in the 1990s. The fall continued after that but at a much smaller pace, going from a yearly -3.5% during 1990-2005 to only -1.8% during 2005-2022. Second, if we take away the effect of reforestation, which was massive in Romania, the -25% becomes -15% (see data from the [European Environment Agency](#)). Third, these are territorial emissions. If we look at [consumption-based emissions](#), the Romanian carbon footprint per capita has actually increased from 3.6 tonnes in 1999 to 4.1 tonnes in 2023. Finally, that’s only for greenhouse gas emissions, one of many environmental pressures. The country’s material footprint increased by 88% between 1992 and 2021. So, this is the miracle equivalent of making someone invisible, except that only one arm disappears.

**Figure 1:** Territorial emissions per sector in Romania ([European Commission, 2024](#))



Source: Climate Action Progress Report 2024, Country profile for Romania, p. 4

**Figure 2:** Per capita consumption-based emissions in Romania ([Our World in Data](#))

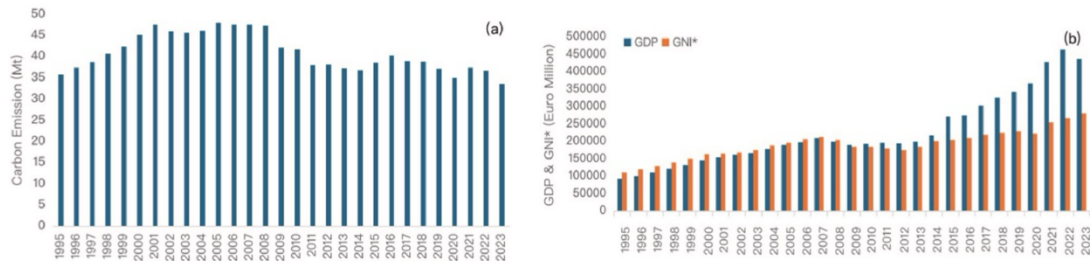


Source: Our World in Data, based on Global Carbon Budget (2025)

Next miracle: Ireland. A 2021 post on the website [Our World in Data](#) says that Irish consumption-based emissions per capita decreased by half between 2005 and 2020 while average income increased by +43%. Similarly, a [post by The Breakthrough Institute \(2021\)](#) affirms that Ireland reduced its consumption-based emissions by -52% between 2005 and 2019 while growing its GDP by +89%. In a [study by ECIU \(2025, p.8\)](#) also covered in *The Guardian*, Ireland is listed as a “consistent decoupler,” a country that has absolutely decoupled in both 2006-2015 and 2015-2023.

Again, there is a trick. Let’s begin by noting that even the Irish state itself does not report an absolute decoupling, which should raise suspicion since governments are usually the first to trumpet green growth.<sup>3</sup> To check what’s really happening in Ireland, let’s look at a [decoupling analysis of economic growth and carbon emissions from 1995 to 2023](#) just published by a team of four researchers from three Irish universities. The result is less dreamy: “Ireland saw intermittent decoupling from 1995 to 2023 but never sustained absolute decoupling” ([Zhao et al., 2026](#), p. 7). In fact, their dataset shows that CO<sub>2</sub> emissions have increased during the 1990s-2000s and only started to decline after the 2008 financial crisis. Levels of emissions in 2023 are roughly the same as they were in 1995 – it’s the kind of decoupling that brings joy to economists but despair to climate scientists.

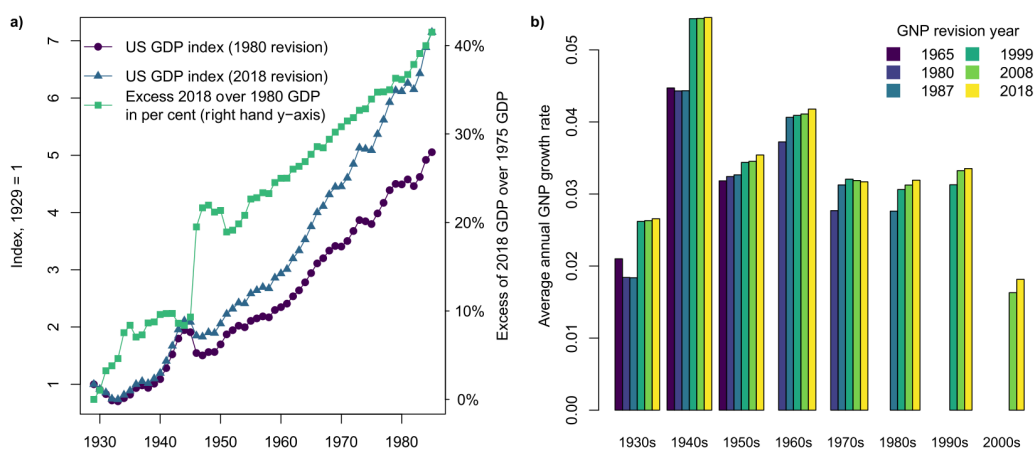
**Figure 3:** Carbon emissions and GDP/GNI in Ireland ([Zhao et al., 2026](#))



Source: Zhao et al., 2026. Ireland's carbon emission trends and degrowth opportunities: Based on modified Tapio - LMDI model, p. 6

Let's pause for a technical point. The Irish case is a perfect example of exaggerated GDP. In order to exclude all the multinational-related financial flows that artificially inflate the Irish economy, [Zhao et al. \(2026\)](#) use a modified Gross National Income, whose growth is much smaller than the one of GDP (see Figure 3b). When you trim away the financial bling bling, the rates of decoupling are far from being miraculous. This was the point made by [Semieniuk \(2024\)](#): each new revision on how GDP is calculated includes more and more activities, which makes decoupling look larger than it actually is (See Figure 4). As the author explains, “between vintages [different methods of calculating GDP], 10-15% of countries switch between relative decoupling and recoupling from energy or materials on decadal intervals, and up to as many countries that decouple absolutely in an older vintage stop or newly start absolutely decoupling in the newer vintage” (p. 12). In an ecological transition, the shape of environmental curve matters much more than the shape of the economic curve, which means that cases of GDP-driven decoupling should not be considered miracle solutions to ecological issues.

**Figure 4:** Variations between different vintages of GDP (Semieniuk, 2024)



Source: Semieniuk, 2024. Inconsistent definitions of GDP: Implications for estimates of decoupling, p. 4

Let's do a last one for sport. According to a (very) short study by the newly-created British think-tank [Energy & Climate Intelligence Unit \(ECIU\)](#), countries representing 92% of the global economy have now decoupled consumption-based carbon emissions and GDP growth. Hooray. And yet, one of the weaknesses of this analysis (it has many) is that it only looks at carbon intensity without considering the actual volume of emissions and their relation to climate targets. This gives the false impression that these decoupled economies are now growing carbon-free in a world where climate change is no longer a problem. This is, of course, far from the truth. Another piece in *The Guardian* ("[Economic growth is still heating the planet. Is there any way out?](#)") shows the ugly proof: a graph showing the massive increase of global emissions, going from 10 Gt in 1960 to almost 50 Gt in 2024. These emissions have never gone down except during large recessions (most notably Covid).

Going beyond carbon, [Fanning and Raworth \(2025\)](#) estimate that the median level of ecological overshoot for the six crossed planetary boundaries went from 75% in 2000 to 96% in 2022. (On a side note, the 38 richest countries, including all the most celebrated decoupling cases, are responsible for 44% of all environmental pressures.) This accelerating degradation of ecosystems should make us think twice before cracking open a bottle of champagne when a country lowers the carbon intensity of its GDP by a few points.

This kind of debunking gives me a Groundhog Day feeling, like in the 1993 film where Bill Murray is stuck re-living the same day over and over. Every now and then, someone brandishes raw data as proof that economic growth has been greened. As much as I would like this to be true, it takes little effort to demonstrate that the reality is not that rosy.

## Will the ecological transition grow or degrow the economy?

Let's now switch to a more theoretical question: Can high-income nations get back within planetary boundaries without contracting their GDP? There is a disagreement between those who think that the ecological transition will boost economic growth (*green growth* or *decoupling*) and others who argue that the downscaling of problematic goods and services will have a net negative effect on GDP

(*degrowth*). I should start by saying that this is not the most thrilling growth-related debate. As a radical demand for system change, the [post-growth literature](#) goes much further than this rather boring accounting question. Studying a complex social-ecological transformation with a GDP lens would be like judging a film by its length – a detail worth knowing but not the most essential feature.

And yet, economists working on degrowth should not shy away from the question. In his article, Jonathan Aldred seems to side with green growth arguing that getting back within planetary boundaries must not necessarily require an overall reduction in levels of production and consumption. “[T]he material scale of economic activity is conceptually distinct from the value of that activity, measured by GDP. The causation, if it exists, from changes in material scale to changes in value (GDP), will be contingent on specific economic structures, and specific beliefs about value, in time and space” (p. 5). For the author, the coupling between the material and the monetary is “not inevitable or universal.”

## Two transition scenarios: degrowth and green growth

I slightly disagree and it will take a few logical steps to understand why. Let’s start by narrowing down the problem, sidestepping an even more theoretical debate on the long-term possibility of a sustainable, growing economy.<sup>4</sup> The discussion we need to have is much more pragmatic. Given [current levels of ecological overshoot and how they’re evolving](#), we know that something historically unprecedented needs to happen to get back within planetary boundaries (either decoupling or degrowth); what we don’t know is which one of these scenarios is more reliable.

To better grasp the two strategies at hand, let’s start from the IPAT equation<sup>5</sup>. If you want to reduce an environmental impact (I), you have three courses of action: shrink population (P), produce and consume less (A), or improve technology (T). For reasons I won’t repeat here, the demographic lever is not an option.<sup>6</sup> Which leaves us with two ideal-typical ways of reaching an environmental target: contract economic activities (*degrowth*) or accelerate technological progress (*decoupling*).

The IPAT identity allows us to put an order of magnitude on these strategies. Imagine a fictional economy that emits 100 MtCO<sub>2</sub> each year with the strong commitment to bring down that number to a yearly 20 MtCO<sub>2</sub> in 10 years, requiring a yearly cut of 15% (the same logic can – and should – be applied to other environmental pressures). Let’s also say that in the previous decade, the emission intensity of that economy decreased by 20 % (so -2.2 % per year) while its economy grew by a yearly 1% per capita. From these numbers, we can calculate two ways of reaching the climate target: an acceleration in technological progress leading to enough efficiency gains to cut emissions (in this fictional example: at least seven time faster than the historical -2.2% per year) or a contraction of economic activities caused by sufficiency policies (at least -12.9 % per year).

In [Cuny and Parrique \(2024\)](#), we apply this method to the European Union (see Figure 5). To keep growing its GDP by a yearly +2% while achieving the -55% climate target in 2030, the EU would need to improve its carbon efficiency twice to four time faster – that’s the *green growth* scenario. But if the speed of efficiency improvements remains the same as observed throughout the 2010s, the only way to reach the climate target is to shrink GDP by a yearly -2% (the *degrowth* scenario).<sup>7</sup> (With colleagues at the University of Lausanne, we’ll soon release a paper presenting a more sophisticated version of this method, which we apply to Switzerland.)

## Is decoupling more likely than degrowth?

Which is more likely, a massive, historically unprecedented acceleration in ecological efficiency (*green growth*) or a massive, historically unprecedented contraction of GDP (*degrowth*)? “It is far from obvious that a future involving, say, 10% decoupling and zero growth is any less likely or realistic than one involving, say, 4% decoupling and 6% degrowth,” Jonathan Aldred writes (p. 10).

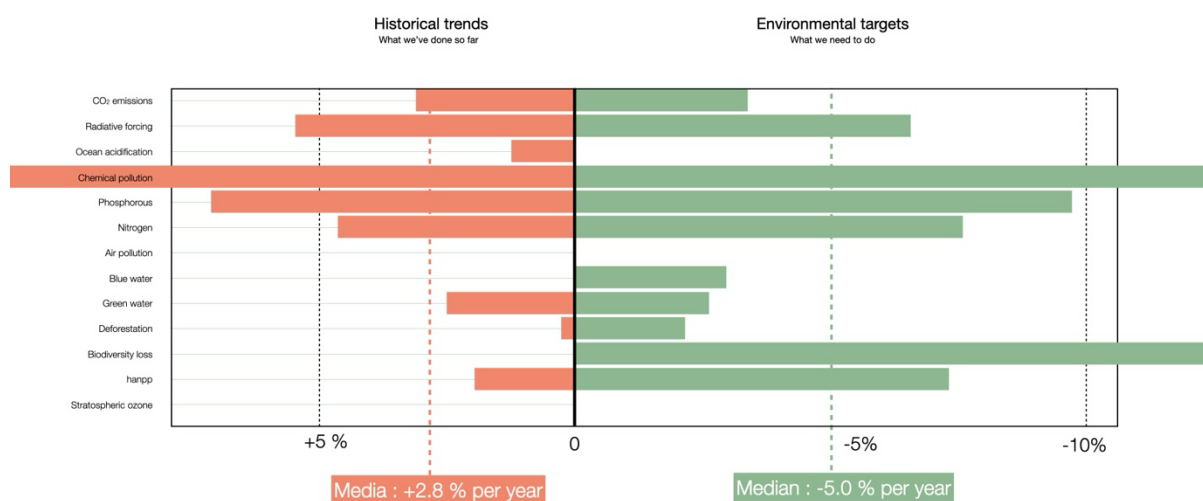
The way I see it, these two ideal-typical scenarios are both unlikely but for different reasons. Degrowth is socially unacceptable but technically straightforward. Said differently, even though it would most probably work, there is little chance that current decision-makers decide to put it in action. Putting political, cultural, and economic challenges aside, degrowth has the benefits of being fast and reversible. It is fast because it impacts footprints today. Closing national flight routes means less planes in the air right now, compared to technological improvements in fuel efficiency that unfolds over longer periods of time. Degrowth also has the advantage of being reversible. Anything we scale back today is something we can possibly resume producing in the future if new, cleaner technologies allow it. Given how risky and unpredictable the ecological situation is, the precautionary nature of degrowth should be considered a valuable asset.

The situation is reverse for green growth: it's socially acceptable but technically uncertain. To ensure that ecological targets are met, one would need a twofold change in the pace (faster innovation) and direction of technological progress (more green innovation). To have an overall impact on macroecological footprints, green innovations must outpace polluting innovations while avoiding [rebound effects](#). In other words, alternatives to polluting technologies (e.g., solar panels, heat pumps, e-bikes, alternative fuels, cultured meat) must emerge faster than new polluting technologies (e.g., AI, horizontal drilling, deep-sea mining, mega-fishing trawlers, wave pools), while being effectively deployed in replacement of old, polluting infrastructure, as opposed to being simply being added on top of it, as Jean-Baptiste Fressoz shows in [More and More and More \(2025\)](#). To cancel the effect of a growing production, the efficiency gains must always be superior to rates of economic growth. Since GDP growth is exponential, this requires a constant acceleration in the speed of green technological progress. And that's where it gets risky. If these innovations fail to materialise, it's game over.

I wrote “technically uncertain” but I'm tempted to call it theoretically impossible.<sup>8</sup> I can imagine building houses without emitting carbon but I can hardly imagine doing so without using materials and without impacting soils. We can surely lower the carbon intensity of energy by switching from oil, gas, and coal to solar, wind, and geothermal heat but this doesn't mean we can keep producing forever more while using forever less energy. The decoupling argument suffers from a carbon bias. It believes that whatever we observe for carbon (a one-off drop in emission intensity during low-hanging fruit transitions) can be generalised for all environmental pressures and sustained forever.

This is what I thought reading [The Guardian's piece about Romania](#). You can shift once from an industrial to a service-based economy and you can shift once from fossil fuels to lower-carbon forms of energy. This solves part of the carbon problem (assuming that industrial activities are not simply outsourced elsewhere) but it doesn't secure other planetary boundaries, some of them much more difficult to decouple than carbon. The [Fanning and Raworth \(2025\)](#) study shows that ecological indicators across all planetary boundaries have worsened at the pace of 3.9% per year between 2000 and 2022 (see Figure 5). In order to get back within safe levels by 2050, one would need to completely invert the trend, going from 3.9% worse per year to 6.9% better (for emissions, it means going from +3.1% per year to -3.4% per year). This is a colossal challenge that is greatly underestimated by decoupling optimists who rely too much on the joker card of technological progress.

**Figure 5:** Historical patterns of ecological overshoot (Fanning and Raworth, 2025)



Source : Fanning and Raworth, 2025. Doughnut of social and planetary boundaries monitors a world out of balance, edited figure

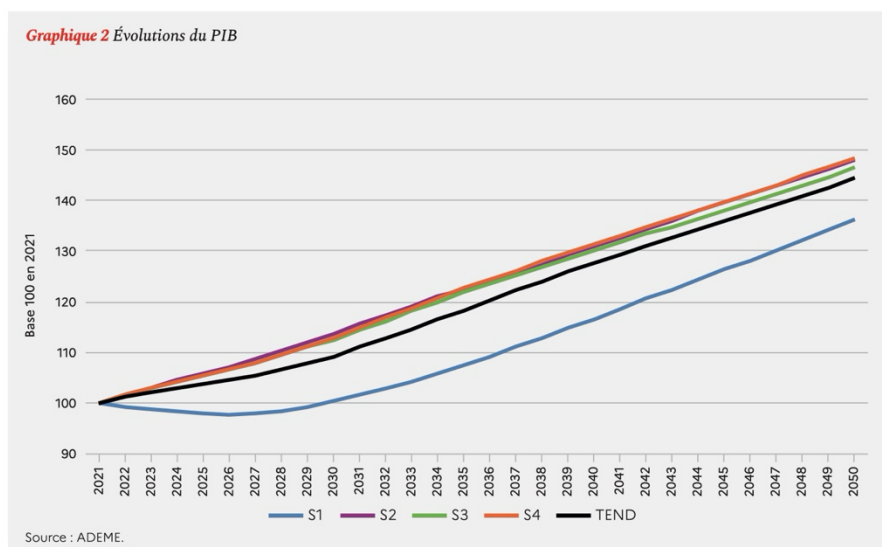
Of course, one way of making endless growth possible would be to change the way we calculate GDP. We could, for example, include yet unrecorded activities just like it already happened for public services in the 1970s and illegal drugs in the 2010s. We could also try to better account for quality changes in products or recentre the concept of value-added on well-being (national accounting frameworks have been evolving slowly until now, but one never knows<sup>9</sup>). Jonathan Aldred hints to this possibility when he writes that “changes in value (GDP), will be contingent on specific economic structures, and specific beliefs about value, in time and space” (p. 5). But changing the way you weigh a kilo of rice is not going to give you more food. The constraint here is not economic but environmental.

## Will the ecological transition boost economic growth?

So far, I’ve treated the two scenarios as mutually exclusive: either a technological boost (*decoupling*) or an economic shrinkage (*degrowth*). What makes it more complicated is that these two phenomena may happen at the same time while affecting each other. There are four possible effects: economic growth can either accelerate or slowdown decoupling and decoupling can, in turn, either accelerate or slowdown economic growth.

Let’s start by looking at how the ecological transition might affect economic activities. “[S]elective downsizing of the material economy may or may not lead to a fall in GDP, depending on whether GDP growth in the material-light economy, the renewable sector (and other essential sectors such as healthcare), outweighs GDP declines elsewhere in the economy” (p. 4). Unfortunately, there is no macroeconomic model powerful enough to simulate these changes in detail. One of the most advanced simulations for France – Ademe’s “Transition(s) 2050” (2022) – concludes that a sufficiency-based scenario (S1 “Génération frugale”) would contract GDP for almost a decade before the economy starts growing again (see Figure 6).<sup>10</sup> In the end, the post-transition GDP in 2050 would be 5.7% smaller in the sufficiency scenario compared to a business-as-usual forecast, this loss being the equivalent of four years of non-existent growth (Ademe, 2022, p. 14).

**Figure 6:** Evolution of GDP in the 4 scenarios ([Ademe, 2022, p. 14](#))



Source : Ademe 2022, Prospective - Transitions 2050 - Feuilleton Macroeconomie, p. 14

Another way to ponder the question is to consider these changes sector by sector. Let's try it out for transport. In 2023, the French government launched a [5-year plan aiming to invest 2 billion euros in active mobility](#). To put this sum in perspective, this is roughly the same amount of money invested each year in highways, which is itself small compared to the 13 billion euros spent annually just to maintain roads. The budget spent for the construction of one single highway (the 62 km of the A69 between Toulouse and Castres) is higher than the yearly budget allocated for active mobility in the whole country. Given how macroeconomically expensive car-based mobility is (reflected in its important contribution to GDP), it seems likely that a massive shift away from cars towards train, buses, and especially bikes and walks would contract GDP.

In the [Ademe \(2022, p. 196\)](#) sufficiency scenario, there is -26% reduction in mobility, half of all trips happening by bike or foot (-55% in the use of cars), the average weight of a car is reduced by -27% and the average speed by -12%. To minimise material and energy expenditure, bike lanes and sidewalks are installed within existing roads. Unfortunately, there is no macroeconomic analysis to determine the net impact of these changes on the contribution of the transport sector to GDP. But imagining a world where people work less and closer to where they live, where they use slower modes of transport and travel closer for holidays, and where cars are small and shared, produced by not-for-profit businesses with low profit margins, I struggle to find where all that additional growth could come from.

There is another example mentioned by Jonathan Aldred that we can explore: more durable smartphones. Today, the average life expectancy of a smartphone in France ranges between [1.9 and 3 years](#). The legal hardware warranty on an iPhone is 2 years while it's 5 years for a FairPhone. If all iPhone users were to get a FairPhone instead, they would replace their phones less often, which means we could all still have phones while producing 60% less of them. Additionally, since a FairPhone (552€) is cheaper than its iPhone equivalent (1329€), and since the profit margins of Apple products are much higher, it makes it even more likely that a switch from iPhone to FairPhone will contract GDP.

Let's continue down the rabbit hole. Let's imagine a world where phones are manufactured by publicly-funded, not-for-profit businesses with a strong commitment for sustainability. It seems

reasonable to assume that such mode of production will generate less GDP points than its private, for-profit alternative. Plus, the value-added in repairing services is much lower than in manufacturing since repair services (and services in general) are more difficult to outsource to countries with lower wages. If people were to have access to open software, repair cafés, tool libraries, with available time on their hands to fix their phones themselves, there would not be much left of the phone industry in national accounts.

One could continue, sector by sector, and product by product, but I suspect the results would be similar: phasing out nature-intensive goods and services would push rates of growth down because their alternatives are less GDP-intensive, and even more so in the smaller, post-capitalist world imagined by degrowthers. So, my answer to the question is a theoretical no: under these settings, it is highly unlikely that the ecological transition would boost economic growth – actually, it’s much more likely to have the precise opposite effect. A corollary argument is that a post-transition economy would run at a much lower level of GDP with much smaller – and rarer – rates of growth.

## Will degrowth slow down the ecological transition?

Jonathan Aldred believes that degrowth will be detrimental to the ecological transition. For him, slower GDP growth means less private investment in green technologies, less public revenues (and thus less public investment in green technologies), and a more general “economic destabilization” (he mentions unemployment). “If degrowthers believe that GDP degrowth is possible without adversely affecting decoupling rates, a specific argument in support of that claim is required” (p. 9).

Here it goes. The first argument I want to make has to do with flows of investment. The ‘growth makes the transition easier’ argument only works if the majority of additional national income goes to green, and not polluting, investments. As we’ve seen earlier with the example of transport, this is not a given. This is a tricky balancing act. If you want economic growth to lower macroecological footprints, then you need green investments to crowd out brown investments; otherwise, economic growth is just doing the precise opposite, further exacerbating ecological overshoot. In an economy where businesses and governments are eager to invest in extractive and polluting activities (building highways, for example), a slower growth rate actually undermines their ability to do so, which is good from a sustainability perspective.

The second rebuttal is much more powerful. The ‘growth makes the transition easier’ argument is financially sound but biophysically flawed. From a monetary accounting perspective where money is the scarce resource, the more cash, the faster the transition. But this is not true when it comes to energy, land, water, materials, etc. In fact, one needs exactly the same materials to build a highway or a bike lane. You can argue that the more highways, the more revenues to build bike lanes, but this argument is not valid in a world where the limiting factor is natural resources (let’s remember here that high-income economies must lower, not only their carbon footprint, but also their material footprint, which will put a strain on available natural resources). From a biophysical accounting perspective, if you build less highways, you’ll have more available resources to build something else. More generally, degrowth liberates a portion of the ecological budget either for deliberate non-use or for alternative purposes.

That’s why a shrinking of GDP is good news. Not only because it lightens macroecological footprints but also because it frees up factors of production. Jason Hickel, the author of [\*Less is more: How degrowth will save the world\* \(2021\)](#), argues that scaling down certain sectors and products, starting with the least necessary, could make resources available for ecological projects: “factories that are presently devoted to producing SUVs can produce solar panels instead. Engineers that are presently developing private jets can work on innovating more efficient trains and wind turbines instead. Labour

that is presently employed by fast fashion firms can be liberated to train and contribute to installing renewable capacity” (Hickel, 2023).

From this perspective, unemployment in nature-intensive sectors is a blessing because it frees up hours of available work for other activities, some of them non-economic in nature (hence the disappearance of part of GDP during a degrowth-inspired transition). Before resorting to panic at the thought of unemployment, let’s remember that the very purpose of an economy is to *economise*, to find more parsimonious ways of securing quality of life. An economy that destroys unnecessary jobs, thus reducing average working time, is an economy doing what an economy is supposed to do.

Let’s continue the passage from Jason Hickel: “it helps to recognize that when we talk about ‘investment’, money is just the vehicle. The real investment actually takes the form of allocating real productive capacity: real labour, materials, energy etc. Once we understand this fact, it becomes clear that a degrowth scenario *enables investment* in green production and innovation, by making real productive capacity available” (*ibid*, italics in original).

This circles all the way back to John Maynard Keynes’s aphorism “anything we can do, we can afford.”<sup>11</sup> Anything we can do in terms of labour and resources can be financially arranged, but the reverse is not true. Even with all the money in the world, you won’t be able to grow food on a dead soil or build a house without materials (except if walls, floors, and windows are made of actual bills and coins). The lesson for 21st century sustainability is this: biophysically, degrowth is a *sine qua non* for selective green growth.

## Going from theories to policies

In this debate, it is easy to get stuck in dogmatic positions: degrowth *or* decoupling. But when it comes to actual policies and real changes in the daily functioning of the economy, the distinction between these positions is more nuanced. But to understand how so, we first need to clarify the difference between *degrowth policies* and *green growth policies*.

There is no magic button, no volume knob hidden at the Ministry of Finance that can switch GDP up and down. When economists talk about “growth policies,” it means reforms aimed at boosting GDP (with no absolute guarantee that they do so). The concept of growth policy is pretty straightforward since it has a single objective: increasing GDP. A *green growth policy* is an umbrella term for all reforms attempting to make economic growth less environmentally-impactful.

For degrowth, it’s more complicated. Jonathan Aldred remarks that “the policy implications are still unclear. Should minimal/zero growth or modest degrowth be a direct objective of policy? If so, how is it to be pursued?” (p. 9). Let’s try to answer this question methodically. In *The political economy of degrowth* (2019, p. 485), I define *degrowth policy* as “a course or principle of action adopted or proposed by an organisation or individual aiming to achieve the objectives of degrowth.”

However, this remains tautological if one doesn’t spell out the *objectives of degrowth*. That’s what I tried to do in *Defining degrowth* (2025), defining the term as “a downscaling of production and consumption to reduce ecological footprints, planned democratically in a way that is equitable while securing wellbeing” – that’s the definition I’ve used in *Slow down or die. The economics of degrowth* (2025), the translation of *Ralentir ou périr. L’économie de la décroissance* (2022). Degrowth is a very specific kind of economic contraction, one that achieves the fourfold objectives of ecological sustainability, economic democracy, social justice, and human well-being.

Achieving these multiple objectives requires a panoply of instruments and strategies. In *Fitzpatrick et al.* (2022), we identified 530 policy proposals in the degrowth literature, including 50 goals, 100 objectives, and 380 instruments. These are not unique to the growth-critical scholarship as most of these instruments actually come from outside of the field. What makes the concept of degrowth

rather unique (and useful) is the way it patchworks these elements together around a new narrative at the confluence of several philosophies (anarchism, feminism, limitarianism, Marxism, anti-utilitarianism etc.) – for an attempt to synthesise the philosophical foundation of the concept, see “Chapter 6: Theoretical foundations” in *The political economy of degrowth* (2019).

Even though degrowth mobilises measures, objectives, and initiatives that one finds in other discourses, its defining trait is to illuminate practices that should be abandoned (e.g., fossil fuels, for-profit corporations, advertising). The focal point of degrowth is mainly – although not exclusively – to phase down or phase out socially unessential and ecologically unsustainable goods and services. That’s the first meaning of a *degrowth policy*: a targeted intervention to reduce production and consumption. Certain policies like food social security, job guarantee, work sharing, and participatory budgets are mobilised to ensure that the road back within planetary boundaries remains democratic, just, and convivial. One could say that these are not degrowth policies per se (because they don’t directly aim at downscaling economic activities), but they are part of a more systemic strategy for change.

What’s the strategy, you may ask? Well, it’s not clear yet. The scholarship is slowly moving towards exploring this question, without much of a breakthrough so far.<sup>12</sup> Most often, we growth-critical academics get stuck justifying *objections to growth* (e.g., the impossibility of green growth, the existence of an income-wellbeing upper threshold, among broader criticisms of capitalism), leaving little time to elaborate the contours of an alternative system and the pathways to get there.

## How to reconcile sufficiency and efficiency policies?

In *Solving the Rubik’s cube of sustainability* (2025), I try to show that efforts in the name of sufficiency and efficiency could go side by side (it was a revamped version of my *Avengers of sustainability* analogy). Here is how the argument goes. According to the Avoid-Shift-Improve (ASI) framework, there are three ways of reducing an ecological footprint: doing less (acting on scale), doing differently (acting on composition), and doing better (acting on efficiency). For instance, to reduce the environmental pressures of housing, we can build fewer dwellings (scale), favour apartments over individual houses (composition), and use less-impactful construction techniques and more sustainable materials (efficiency).

The main point of the talk was twofold. First, the order of these steps matters. It makes sense to start by *avoiding* activities since the most renewable resource is the one we do not need. Doing less is the Holy Grail of an ecological transition. Easy, fast, and failsafe, it’s the lowest hanging fruit. However, it cannot be applied to everything, which brings me to step two. What cannot be avoided can be *substituted*, which requires finding more ecologically efficient ways of satisfying the same need. And finally, the third step: whatever cannot be avoided and substituted can be *improved*, either technically or institutionally.

This is a chain of action from the fastest, most straightforward to the slowest, more uncertain. If you cancel a trip, then the full footprint of the trip disappears. It’s a bit like in the movie *Minority Report* (2002) where crimes are solved before they happen; minimalism prevents environmental harm before it even begins. If you cannot avoid the trip, you can perhaps favour less nature-intensive modes of transport, for example riding a train instead of driving. And if you can neither cancel the trip nor ditch the car, then it is best if you use a light electric car (technical improvement) shared among several households (institutional improvement).

Any serious transition scenario should include these three steps of resolution (hence the analogy with a Rubik’s cube that can only be solved following a specific sequence of moves). The Avoid-Shift-Improve framing is modular, which allows for various combinations to fit sectors with different characteristics. For specific goods where less-polluting alternatives and better technologies are

available, *shift* and *improve* policies can be very effective. Other challenges without foreseeable alternatives might, on the other hand, require *scale* policies. If you have a lot of *shifting* and *improving* with very little *avoiding*, the impact on GDP might still be positive. If you mostly rely on *avoiding*, you may end up with something closer to an actual degrowth.

The second point of [Solving the Rubik's cube of sustainability \(2025\)](#) was that each step facilitates the following. For example, fewer trips (scale) make it easier to accommodate a modal shift, for example from flights to trains (composition), and the fewer trains make it easier to upgrade and renew existing train infrastructure (efficiency). I won't repeat myself here. It's precisely the same argument I developed earlier: from a biophysical accounting perspective, a smaller economy is much easier to fit within limited planetary boundaries than a growing one.

## Conclusion

This has been a highly abstract journey. Let's summarise the two claims I've made. First, the required actions to bring back high-income economies within planetary boundaries are very likely to contract their GDP. It is important to say it out loud because the implications for economic organisation are far-reaching. Our current economic systems are not designed to function in the negative. We environmental and ecological economists must therefore urgently find concrete solutions on how to organise an economy that can prosper without growth, as [Tim Jackson](#) would say. Luckily, a large part of current scholarly efforts in [growth-critical studies](#) are addressing this crucial question, and the contribution of Jonathan Aldred on consumption-reduction policies and rationing is, in that light, very valuable.

The second point contrasts with the first. From an environmental policy perspective, we need to cool down the clash between degrowthers and green growthers. When it comes to daily changes in the real economy, these two sides have a lot in common (even though degrowth tackles a much larger range of issues<sup>13</sup>). To find the most effective way of reducing macroecological footprints, we need sufficiency and efficiency. Let's therefore make sure to keep bridges open between different approaches.

## Footnotes

<sup>1</sup> Here are the three recent pieces in *The Guardian*: “[‘The trend is irreversible’: has Romania shattered the link between economic growth and high emissions?](#)” (February 2026); “[Economic growth is still heating the planet. Is there any way out?](#)” (February 2026); “[Economic growth no longer linked to carbon emissions in most of the world, study finds](#)” (11 December 2025)

<sup>2</sup> It’s even visible on the graph shown in [The Guardian’s article](#): -27% emissions during 1990-1992, -19% during 1996-1999, -12% during 2008-2010, and -2,9 % during 2019-2020.

<sup>3</sup> The conclusion of a [2023 note from the Irish Department of Finance](#) (p. 6) is worth quoting at length: “Over the period as a whole, GHG emissions reductions achieved through improvements in the carbon intensity of energy and in the energy intensity of economic growth are small relative to the continued and robust rise in the contributions from economic growth per capita and the increase in population. While a ‘relative decoupling’ has occurred over the last quarter-century, with the economy becoming relatively more energy and carbon efficient, an ‘absolute decoupling’ has not been achieved, with the result that emissions are still higher than in 1990.”

<sup>4</sup> Famously, even Nicholas Georgescu-Roegen (1906-1994) and his disciple Herman Daly (1938-2022) didn’t agree on this question. In the seminal *The Entropy Law and the Economic Process* (1971), N. Georgescu-Roegen argued that the law of entropy meant that an economy would unavoidably face some kind of decline – one of the earliest occurrences of the term “décroissance” (degrowth) was actually a French translation of the selected works by Georgescu-Roegen in 1979 with the title “La décroissance. Entropie, Écologie, Économie” (Degrowth. Entropy, Ecology, Economy). Herman Daly (for an overview of his lifework, see [Victor, 2022](#)) disagreed with N. Georgescu-Roegen, which led to develop the concept of a “steady-state economy” (e.g., [Daly, 1974](#)).

<sup>5</sup> The IPAT equation first appeared in 1971, in a critique of Barry Commoner’s *The Closing Circle* (1971) written by Paul Ehrlich and John P. Holdren (for a history, see [Holdren, 2018](#)).

<sup>6</sup> See [The political economy of degrowth](#) (2019, Chapter 7, “Crowded? The denatalist critique, pp. 413-425).

<sup>7</sup> If the acceleration in technological progress seems reasonably reachable or if the yearly rate of degrowth seems rather mild, keep in mind that, (a) this is only for carbon, ignoring other planetary boundaries; (b) that we only counted territorial emissions – which is 20 % lower than the [EU carbon footprint](#); (c) and that we uncritically adopted the European Commission’s -55% by 2030 target, which is much lower than what scientists recommend (close to -60 / -70 %).

<sup>8</sup> The author is aware of this, mentioning Nicholas Georgescu-Roegen’s *The Entropy Law and the Economic Process* (1971): “human activity on Earth is ultimately subject to a range of material and energy limits. Eventually these limits must constrain GDP growth, because while GDP growth with low material throughput is possible, ongoing immaterial growth is not” (Aldred, 2026, p. 11).

<sup>9</sup> The idea of Gross National Product was born in the 1930s and internationalised in the 1950s (for historical accounts, see [Philipsen, 2015](#) or [Schmelzer, 2016](#)). There have been [five methodological revisions](#) since (1960, 1964, 1968, 1993, and 2008) without major changes in the philosophy of the measure. Alternative indicators of wealth started developing in the 1970s with more than 200 hundreds of them existing today ([Ríos-Ocampo et al., 2026](#)), even though none of them have dethroned GDP.

<sup>10</sup> The convergence of the curves toward a steady, endless economic growth results from a specific assumption built into the model about long-term productivity gains, the variable driving growth. So, this graph should be taken with a pinch of salt; it’s only a quantitative visualisation of the assumption of that productivity gains increase continuously therefore leading to endless growth.

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<sup>11</sup> Here is the full quote from John Maynard Keynes's 1942 BBC address, "Let us not submit to the vile doctrine of the nineteenth century that every enterprise must justify itself in pounds, shillings and pence of cash income [...] Why should we not add in every substantial city the dignity of an ancient university or a European capital [...] an ample theater, a concert hall, a dance hall, a gallery, cafes, and so forth. Assuredly we can afford this and so much more. Anything we can actually do, we can afford. [...] We are immeasurably richer than our predecessors. Is it not evident that some sophistry, some fallacy, governs our collective action if we are forced to be so much meaner than they in the embellishments of life?"

<sup>12</sup> For example, the book *Degrowth & Strategy: How to bring about social-ecological transformation (2022)*, "Chapter 4: Political Strategies for Degrowth" in *Exploring degrowth: A Critical Guide (2020)*, "Chapter 5: Pathways to degrowth" in *The future is degrowth (2022)*, a series of [policy briefs](#) coordinated by the organisation Research & Degrowth, and this timely article that came out in *The Guardian* ("[We can move beyond the capitalist model and save the climate – here are the first three steps](#)") – for my own synthesis, see "Chapter 8: Strategies for change" in *The political economy of degrowth (2019)*. More generally, see [Fitzpatrick et al. \(2025\)](#) for a survey of the strategies and tactics of degrowth academics and activists.

<sup>13</sup> Degrowthers have done an extensive work clarifying key positions in political economy concerning money (e.g., [Olk et al., 2023](#)), work (see [Vincent and Brandellero, 2023](#) for a review), business models (e.g., [Nesterova, 2020](#)), among a variety of more detail topics like housing ([Nelson and Schneider, 2019](#)), tourism ([Fletcher et al., 2020](#)), food ([Nelson and Edwards, 2021](#)) – for a good overview of this literature, see [Parrique, 2019](#); [Kallis et al., 2018](#) and [Kallis et al., 2025](#); [Schmelzer et al., 2022](#). The green growth scholarship, on the other hand, is mostly empirical, very carbon focused, with little elaborations on its associated economic system (for an overview, see [Khan et al., 2025](#)).

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