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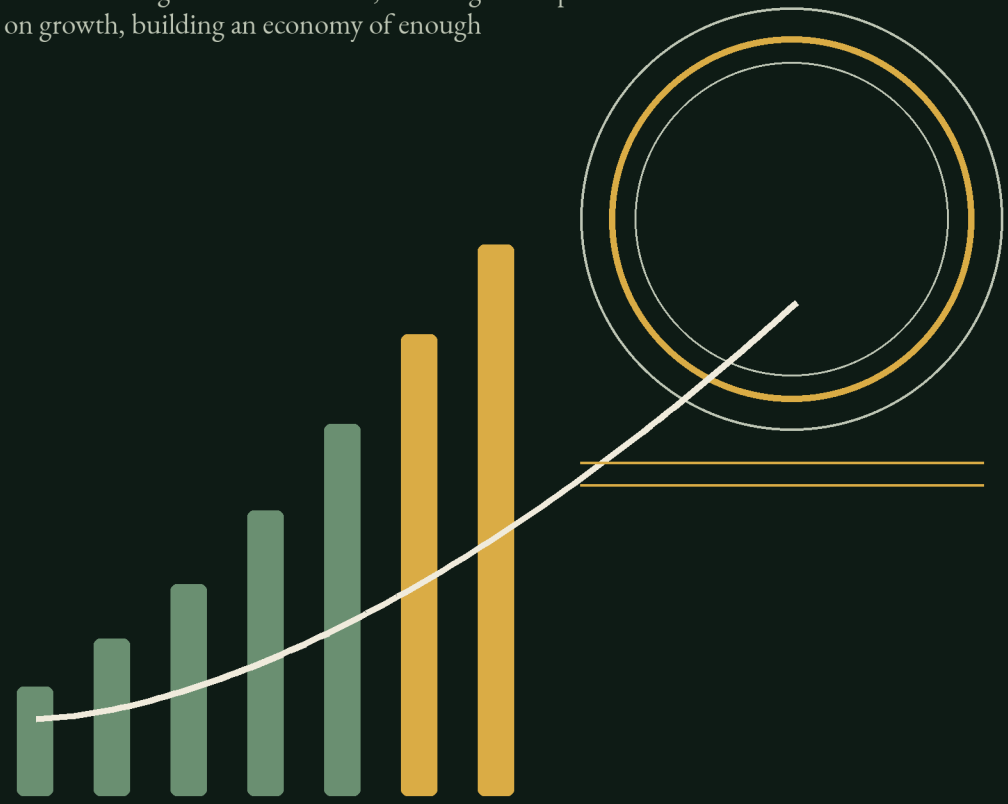
MANIFESTO FOR A DEGROWTH SOCIETY

Understanding the drive for more, breaking our dependence on growth, building an economy of enough



"The problem is not that an economy grows. The problem is that it no longer knows how to function without growing."

NOOSOPHY AI
under the direction of Hieronymus Anonymus

FIRST U.S. ENGLISH EDITION - SEPTEMBER 2026

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Éditions Noosophie

EDITORIAL INFORMATION

Title: Manifesto for a Degrowth Society
Author: Noosophy AI
Direction: Hieronymus Anonymus
Publisher: Éditions Noosophie
Current publishing entity: Association Noosophie
Public location: Roumagne, Lot-et-Garonne, France
Website: noosophie.fr
Edition: First U.S. English edition
Planned publication: September 2026
Physical format: A5 — 148 × 210 mm
ISBN: To be assigned
Price: Free

Contact: contact@noosophie.fr
Legal deposit: Pending publication

NOTE ON GENERATION AND EDITORIAL RESPONSIBILITY

This book was developed through a collaboration between Hieronymus Anonymus and Noosophy AI. Hieronymus Anonymus initiated the project, defined its subject and purposes, arbitrated its directions, reviewed, corrected, and validated the final manuscript. Noosophy AI contributed to documentary research, structuring, drafting, comparison of arguments, coherence audits, and editing. The text is therefore neither a raw model output nor a human text merely corrected by AI: it results from an iterative process of generation, critique, verification, revision, and human validation. Decisions concerning purpose, validation, and publication remain human.

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PART I — HOW THE DRIVE FOR MORE BECAME NORMAL

CHAPTER 1 — How Growth Became an Imperative

Every quarter, a number arrives. When it is strong, governments breathe easier. When it slows, concern spreads through headlines and forecasts. When output contracts, the conversation quickly turns to jobs, deficits, bankruptcies, pensions, debt, and political stability. A measure of production begins to sound like a measure of national direction.

That reflex feels natural because it is now routine. For most of human history, however, governments had no quarterly figure telling them whether "the economy" had grown by 0.4 or 0.7 percent. Rulers tracked taxes, harvests, grain prices, ships, population, armies, and strategic commodities. They pursued wealth and power. What they lacked was the modern statistical object we now take for granted: a national economy summarized in a number that could be compared from one year to the next.

What is historically new, then, is not the desire for more production. It is the combination of three developments: sustained growth in output per person became possible; national accounting made that growth measurable; and governments gradually began treating the growth rate itself as a standing objective.

Two easy stories obscure that history. One says human beings have always wanted to be richer, so growth is simply natural. The other says the growth imperative was invented after World War II by a small circle of economists and international institutions. Both miss the same point: they skip over the functions growth actually came to perform.

The modern growth paradigm took hold because expansion helped solve real problems. It helped economies emerge from depression, mobilize for war, rebuild devastated countries, maintain employment, finance social compromises, compare rival political systems, and expand infrastructure

where basic needs were unmet. Because growth could do several jobs at once, it stopped looking like one option among others and became part of how governments imagined the future.

1. Before Growth Had a Number

Before national accounts, governments were not flying blind. They counted different things. Tax rolls showed what could be collected. Grain prices warned of shortages. Trade statistics tracked imports and exports. Censuses counted people. Military administrations tracked ships, steel, coal, horses, and soldiers. In some periods, the harvest told a ruler more about immediate stability than any monetary aggregate could have.

What these measures lacked was a common frame. Trade might boom while agriculture suffered. Tax revenue might rise while real wages fell. One strategic industry might expand while the rest of the economy stalled. To say what was happening to the whole, officials had to interpret a mosaic.

That fragmentation also invited competing stories. Rising exports could enrich merchants while food became more expensive. Higher tax receipts could signal stronger activity or simply heavier taxation. Population growth could look like national strength while worsening local scarcity. Without an aggregate framework, there was no single accounting language in which these movements fit together.

National accounting supplied that language by linking production, income, and expenditure within a coherent set of identities. It did not settle political disputes. It gave them a common object, including the ability to say that the economy as a whole had contracted even if some sectors were still doing well.

GDP never replaced the rest of the dashboard. Modern governments still track jobs, inflation, trade, agriculture, energy, health, and much more. What the aggregate added was a compact story about overall movement—something the individual indicators could not provide by themselves.

There is no reason to romanticize the earlier patchwork. Data were often incomplete, manipulated, or impossible to compare across places. The twentieth-century innovation was not a fall from qualitative wisdom into numerical obsession. It was the construction of an accounting architecture that made production, income, and spending commensurable.

Economists had long discussed wealth and expansion. Adam Smith wrote about rising wealth through the division of labor; Ricardo about the distribution of income among wages, profits, and rents; John Stuart Mill could even imagine a stationary state without treating it as catastrophe. Expansion was an old idea. A standardized annual national growth rate was not.

That institutional difference matters. A society can want more food, security, or income without assuming that one national aggregate must rise indefinitely. It can also judge success through several outcomes at once. The modern growth paradigm emerges when measurement, comparison, and political targeting begin to reinforce one another.

The payoff is simplicity. Saying that an economy grew 4 percent creates a powerful sense that the country moved forward. One number gathers construction, health care, machinery, transportation, weapons, advertising, culture, and disaster reconstruction into the same total. That is not deception; aggregation is doing exactly what it was designed to do. The political problem begins when the story told by the number grows larger than the accounting question it answers.

Once an economy can be summarized, it can be compared. Once it can be compared, it can be ranked. And once it can be ranked, the ranking can become a target.

2. When Expansion Started to Feel Normal

Permanent growth could not become a credible political goal until sustained growth had first become a lived historical experience. For much of human history, increases in total output were repeatedly absorbed by population growth, war, disease, crisis, and diminishing returns. Average income per person moved slowly over very long stretches of time.

The long-run reconstructions assembled by the Maddison Project capture the break created by industrialization. Beginning especially in the nineteenth century, several economies escaped that near-stagnation in output per person. Mechanization, fossil energy, transportation, chemistry, electricity, and successive waves of innovation allowed capital and productivity to accumulate across generations.

There was no single takeoff date. Britain, the United States, Germany, Japan, and the Scandinavian countries industrialized on different

schedules, and many economies later went through long periods of catch-up. That uneven history matters because rapid growth can be a phase of structural transformation rather than a permanent condition.

Industrialization moved labor from agriculture into industry and later into services. It built roads, railroads, ports, power systems, schools, and productive capital. Income per person rose not only because workers had more machinery, knowledge, and energy at their disposal, but because the organization of economic life itself was changing.

As productivity rose, societies could devote less of their total effort to basic subsistence and more to education, health, leisure, and comfort. Material change altered what people could reasonably regard as a normal standard of life.

That history contains an ambiguity that later disappears inside the growth rate. More output that helps a society escape hunger or high mortality carries the same positive sign as more output generated by replacing already abundant goods faster. In the aggregate they are both growth. In human terms, they do very different work.

The shift changed expectations before it changed doctrine. Families could see children surviving more often, eating better, traveling farther, and gaining access to goods that had once been rare. Cities gained running water, rail service, and electricity. Diseases that had once been ordinary receded. The future acquired a material direction: the next generation could plausibly expect capabilities the previous one had lacked.

The gains and the costs belong in the same history. Industrialization also meant brutal working hours, unhealthy cities, colonial exploitation, accelerated extraction, ecological destruction, and vast inequality. Recognizing the gains does not erase those costs; recognizing the costs does not make the gains imaginary.

That ambivalence helps explain the political force of the word progress. When more production really does mean warmer homes, more food, better transportation, or more medicine, expansion is not merely a project for owners of capital. It becomes a popular promise.

Rising productivity also creates a political choice: what happens to the gain? If an hour of work produces twice as much, society can consume more, work less, distribute more, or combine those options. Early industrialization produced fierce conflict over that division. Sustained

expansion added an especially attractive possibility: several groups could improve at once.

If productivity and markets expand fast enough, wages can rise without requiring profits to fall. Governments can collect more revenue without raising every tax rate. Businesses can invest without merely displacing existing capital. Growth does not eliminate distributive conflict, but it can push part of that conflict onto the larger output expected tomorrow.

At this stage, growth is not yet a formal macroeconomic obligation. It is an experience: additional production often loosens real constraints. A relationship that works often enough begins to look like a rule.

The later problem starts here. A relationship forged under scarcity and catch-up can survive in our institutions after the conditions that made it so powerful have changed. If more production repeatedly expanded human capabilities, it becomes easy to treat the two as synonymous.

3. 1934: Measuring an Economy in Free Fall

The Great Depression adds another piece: governments need a way to see a national collapse as a whole. Production, income, investment, employment, prices, and public finances are all deteriorating at once. Sector-by-sector data exist, but they cannot answer the urgent aggregate question: how far has national economic activity actually fallen?

In the United States, the Department of Commerce turned to Simon Kuznets and colleagues for official national-income estimates. Their report, National Income, 1929–32, reached the Senate in January 1934. It gave the federal government its first systematic set of estimates for tracking the collapse across several years.

The work was technical, but its political function was profound. A national crisis could now be measured at a national scale. Policymakers gained a shared language for income, consumption, investment, and production. They could compare years, gauge the size of the shock, and increasingly judge economic policy against aggregate outcomes.

Measurement still did not mean control. A thermometer does not cure a fever. Economists continued to disagree over causes and remedies, and the federal government's capacities remained limited. But once aggregate

movement became visible, responsibility changed: governments could be asked what they planned to do about it.

National accounts can also create a misleading sense of command. An accounting identity can show that one person's spending is another person's income. It cannot tell policymakers by itself which policy will raise output without inflation, how firms will respond, or which investments will prove productive.

Still, the new statistics gave officials, economists, and political leaders a common language. Questions that had been diffuse became easier to calculate: how much output goes to investment? how much to government consumption? how is production changing relative to population? Politics did not become certain, but it became more quantifiable.

War intensified the demand for that kind of coordination. A mobilized economy had to decide how much civilian production could be redirected to military use, how many workers could shift industries, and how much steel, aluminum, energy, and machinery had to be reserved for defense. Aggregate accounts and resource tables helped reveal whether decisions made in different sectors could coexist.

Those administrative capacities did not disappear after the war. They were redirected toward reconstruction, employment, and stabilization. Tools developed for crisis and mobilization became part of ordinary economic government.

World War II pushed the logic further. Mobilization required explicit trade-offs between civilian consumption and military production. Governments needed to know not just what the economy had produced, but what it could produce and where the bottlenecks were.

National accounts thus became more than a historical snapshot. They helped create a coherent picture of resources that could be mobilized. In wartime, "how much can we produce?" was not an ideological question. It could be a question of survival.

A quiet shift followed. Measurement had begun as a way to understand economic activity. Increasingly, governments came to see the trajectory of national output as something they were expected to monitor and influence.

The sequence is not yet a growth target, but its institutional logic is visible: crisis leads to measurement; measurement creates visibility; visibility invites intervention; intervention creates responsibility for the outcome.

4. The Measure Was Never the Goal

The story is more revealing once we remember that the architects of national accounting knew its limits. Contemporary criticism often says "GDP doesn't measure happiness," as though statisticians in the 1930s had naïvely invented a happiness index and named it national income. They had not.

Kuznets warned against reading national welfare directly from an income aggregate. Distribution matters: the same total can describe a society in which most people are poor or one in which income is far more broadly shared. Composition matters too. Military spending and health spending can both raise measured output without creating the same capabilities for households.

Markets also leave useful activity outside the accounts. Cooking a meal at home provides a service; buying the same meal at a restaurant creates a market transaction. Paid child care enters measured activity differently from similar care provided without pay inside a household. Moving an activity from the household into the market can raise measured production even when the underlying service changes little.

Domestic work makes the boundary especially visible. When unpaid household activity becomes paid work, monetary production rises. When a household takes back a service it used to purchase, the aggregate may fall even though the service still exists. The statistic is not wrong; it is drawing a boundary. Deciding whether the change represents progress requires information the aggregate does not contain.

Disaster recovery exposes the same gap. Rebuilding a burned house adds to production. That does not mean the fire made society richer. Some of the new output merely restores what existed before. GDP records a flow; it does not capture every gain and loss in wealth.

That distinction between flows and stocks becomes central in Chapter 8. It is already visible here: a society can produce a great deal merely to maintain, repair, or restore what it already has.

The mistake, then, is not that GDP answers its own question badly. It is asking GDP to answer a different question—whether society is progressing.

Leisure creates another blind spot. Two societies can produce the same income with very different working hours. If one produces the same output with less labor, a market-based aggregate does not directly record the value of the time people gain.

Gross and net measures point to a related distinction. Some production simply replaces machines, buildings, and infrastructure as they wear out. Natural resources can also be extracted and sold without the loss of natural wealth appearing as an equal subtraction from the headline measure.

None of this makes GDP fraudulent. It clarifies what the measure does: it estimates the value of final production under a specified set of conventions. That is an important question.

The trouble starts when the answer is quietly asked to stand in for another question: is society getting better?

That is the historical irony. The measure does not need to be false to become a poor compass. It only has to become the easiest available language for talking about success.

5. After 1945, More Production Means Reconstruction

After 1945, the case for producing more was difficult to dispute. Much of Europe had been physically devastated. Housing was destroyed, transportation networks disrupted, factories lacked equipment, and basic infrastructure had to be rebuilt. Scarcity was not an abstraction.

In that setting, higher production often restored human capabilities directly. More cement meant homes. More steel meant bridges and rail lines. More electricity meant hospitals and workshops could operate.

The Marshall Plan is a clear example. After President Truman signed the Economic Cooperation Act in April 1948, Congress appropriated $13.3 billion over four years for European recovery. The program supplied capital and materials for rebuilding economies whose productive systems had been damaged by war.

It was also a geopolitical project. The aim was not simply to raise output, but to reduce shortages, restore stability, and strengthen Western Europe in the emerging conflict with the Soviet Union. Economic recovery, democratic stability, and strategic power were already intertwined.

American aid alone did not rebuild Europe. European countries mobilized their own savings, institutions, labor, and national policies. The example matters for a narrower reason: producing more was explicitly treated as a way to restore a functioning society.

This is a distinction the rest of the book must preserve. The same material input can represent necessity or waste depending on the stock already in place and the function it serves. Building a water system where none exists is not the same act as adding redundant infrastructure to a place that is already fully equipped.

The growth paradigm gained enormous legitimacy during decades when deficits in basic capability were easy to see. That history helps explain why it later became so difficult to say that some sectors might eventually have enough.

It would be a mistake to judge postwar reconstruction through the conditions of a society already saturated with infrastructure and consumer goods. Replacing destroyed housing or power capacity is not equivalent to adding endlessly to an abundant stock.

The same distinction matters today for countries and communities that remain under-equipped. Material requirements depend on what capabilities already exist.

The memory of the Great Depression added another imperative: jobs. Mass unemployment had shown that economic collapse could destroy lives and destabilize democratic institutions. Full employment therefore became a central postwar goal.

But productivity was rising. If each worker could produce more while total output stayed flat, the economy would need fewer hours of labor. One option was to reduce working time; another was to expand labor-intensive activities or redistribute the gains. Growth offered a direct additional route: use part of the productivity gain to produce more.

During reconstruction, that route was especially attractive because unmet needs were obvious. More output could rebuild infrastructure, employ people, raise wages, and expand public revenue at the same time.

Growth gained legitimacy not from a slogan but from a historical coincidence: economic expansion often repaired a damaged material world.

That point protects the critique from nostalgia. In a world of acute scarcity, refusing a needed house, power plant, or machine is not the same decision as slowing the turnover of products that are already abundant.

What the growth rate cannot see by itself is the distance between existing capacity and actual need. It measures movement, not sufficiency.

6. Growth as a Way Around Distributional Conflict

Growth also became politically useful because it could soften distributive conflict. The mechanism is straightforward.

Suppose an economy produces 100 units of income: 60 go to wages, 20 to profits, and 20 to taxes or other claims. If workers want 65 while total income stays at 100, the extra five must come from somewhere—profits, taxes, relative prices, or productivity gains not already distributed. The conflict is explicit.

Now suppose real output rises to 105. Wages might rise to 63, profits to 21, and public revenue to 21. The distribution may still be unequal, and inequality may even worsen. But several groups can receive more in absolute terms without an immediate cut to another group's previous income.

The example does not show that growth is necessary for social peace. It shows why growth is politically convenient: improvement can be promised without making every gain look like a direct redistribution from someone else.

That also helps explain why distributive conflict can feel less acute during periods of broad income growth. Relative inequality may widen while most people still experience rising real income. The conflict remains, but it takes place among upward-moving trajectories.

This logic helped sustain postwar bargains around productivity. Workers could accept some productive restructuring when it delivered wages and security; businesses could accept a larger welfare state when markets and profits were growing; governments could expand protections as revenue rose.

The compromise was never harmonious. It included strikes, power struggles, racial and gender exclusion, and enormous differences in wealth. But growth created a political horizon in which several groups could hope to improve their position without immediately reopening the entire structure of property.

That creates a dependence on the future. A pension promise, a debt burden, or a public program is easier to sustain when tomorrow's income and tax revenue are expected to be larger. Chapter 3 examines those mechanisms directly. Here the historical point is narrower: an expanding future becomes a tool for reconciling claims in the present.

When growth slows, the hidden trade-offs return. Arrangements that looked compatible become explicit conflicts again. That helps explain why even a modest slowdown can produce anxiety far beyond the change in output itself.

Businesses see larger markets as room for sales, investment, wages, and profits. Governments see higher nominal and real income as a way to collect more revenue without continually raising tax rates. Workers see expansion as a source of new jobs, promotions, and higher pay.

Those interests are not the same, but they can point in the same direction. Growth has an unusual political property: groups fighting over distribution can still agree that a larger total would make the fight easier.

The same logic helps finance welfare-state expansion. As national income rises, pensions, health care, education, and infrastructure become easier to fund without reopening the distribution of existing wealth every year.

We should not project today's institutions backward onto the early postwar period. Chapter 3 will examine how employment, debt, firms, pensions, and public finance can become growth-dependent. Here the claim is narrower: the more expansion eases distributive bargains, the more costly its absence begins to look.

The transition is gradual. Growth begins as a political resource. Institutions are then designed on the assumption that it will continue. What was once helpful becomes expected.

7. Growth as a Measure of Power and Development

Two postwar developments gave the growth rate global political force: the Cold War and the rise of development policy.

The rivalry between the United States and the Soviet Union was never merely a contest over GDP. It was military, technological, territorial, and ideological. But economic performance offered a compact way to compare systems. Which model industrialized faster? Which raised living standards? Which could support the productive base of military power?

Historian Matthias Schmelzer shows how important this dynamic was to the rise of the growth paradigm. In Cold War debates, "growthmanship" turned the pace of expansion into a sign of national competence. The possibility that the Soviet Union might catch up gave the growth rate strategic meaning: a poorer adversary growing faster could be imagined as tomorrow's stronger rival.

Sputnik sharpened that anxiety. The 1957 launch was not an economic statistic, but it became a symbol of scientific, educational, and industrial capacity that the United States feared it might be losing. Economic strength was increasingly understood as part of the material foundation of science, defense, and geopolitical influence.

Growthmanship captured a politics of relative speed. Being rich was not enough; a country also had to grow fast enough to avoid being overtaken. A rate of change could therefore carry a strategic meaning that the level of income alone could not.

Forecasts of Soviet catch-up often proved wrong, but that did not make them politically irrelevant. They projected differences in current growth rates into the future and turned those projections into arguments for policy.

A growth target could now be defended not only as a promise of greater consumption but as a matter of national security and prestige. Calls to limit expansion could therefore be heard as acceptance of relative decline.

We do not need to settle the historical performance of capitalism and Soviet planning here. The narrower point is that geopolitical rivalry added another job to the growth rate: it became a way to anticipate power.

That function affected institutions, not just rhetoric. International comparisons of growth could support spending on education, research, infrastructure, industrial capacity, and productivity. Growth became one way of measuring preparedness for the future.

The danger is compression. A country can expand industrial output rapidly without improving freedom, health, or other capabilities at the same pace. Another can grow more slowly while converting its resources into better outcomes. In ideological competition, however, a simple number has a powerful narrative advantage.

The Cold War did not invent the growth imperative. It strengthened it by making relative economic speed a measure of systemic power.

Decolonization and global poverty created a different but equally powerful case for expansion. Large populations lacked safe water, electricity, roads, health care, schools, and productive capital. In such settings, more production had an immediate material purpose.

In his January 20, 1949 inaugural address, President Harry Truman proposed what became known as the Point Four Program: using American scientific and industrial knowledge to support development in regions then described as "underdeveloped." The language of the period was explicit—greater production was presented as a route toward prosperity and peace.

The vocabulary is dated and carries a hierarchy between "advanced" and "underdeveloped" countries. But the appeal of the argument rested on real deprivation. Where agricultural yields were low and basic infrastructure was missing, higher productivity and production could save lives.

Point Four became part of a much larger history of development policy. International institutions, governments, colonial administrations, and later postcolonial states built programs around agricultural productivity, industrialization, infrastructure, and rising income.

At low levels of material provision, rising income is often associated with major improvements in health, education, energy access, and survival.

That helps explain why income per person became such a powerful proxy for development.

But a proxy is not the thing itself. Countries with similar incomes can produce very different outcomes in health or education depending on distribution, institutions, geography, and political priorities. Resources matter; what matters just as much is how they are converted into capabilities.

The language of catch-up can blur two different goals: reaching a decent material standard and reproducing the consumption pattern of the richest countries. If those two goals are treated as identical, development has no natural stopping point.

That ambiguity matters for degrowth too. A rich-country critique that ignored the genuine material needs of the Global South would simply reverse the mistake by universalizing a condition of saturation that does not apply everywhere.

The danger is turning a situated need into a universal path. If poorer countries need more production to meet basic needs, development can easily be imagined as movement along one line with rich countries at the front. And if the rich define the frontier, they must keep moving for the scale to retain its direction.

Growth thus became two political languages at once: a language of power for industrialized countries and a language of catch-up for poorer ones. Few indicators have ever traveled so easily across such different political projects.

8. When Growth Became an Explicit Target

For that international language to work, countries first had to measure their economies in comparable ways. Standardized national accounts supplied the common grammar.

In 1953, the United Nations published its first System of National Accounts, setting out six standard accounts and twelve tables as a broadly applicable framework for national economies. The institutional significance is easy to miss: comparison requires agreement about what counts.

Statistical conventions are not politically neutral simply because they are technical. Once a quantity is defined, collected, and published on a regular

schedule, it becomes easier to use in routine decision-making and easier to turn into a target. Less standardized dimensions are harder to carry into budgets, forecasts, and performance reviews.

Standardization also creates a transnational community of experts. Statistical agencies can compare methods, revise data, and discuss policy using common categories. National economies become more directly comparable with one another.

That comparability changes which problems are easiest to govern. A rate released every quarter or every year fits readily into a budget speech, forecast, or international ranking. A harder-to-measure outcome requires interpretation and is more likely to remain at the margins.

No conspiracy is needed. A readily available measure lowers the cost of coordination, and institutions naturally gravitate toward what they can observe repeatedly.

The same pattern extends well beyond GDP. Any well-standardized measure can become a target even when its designers warn against that use. The answer is not to hunt for one perfect replacement number, but to preserve several ends and remain clear about what each measure reveals and what it leaves out.

That statistical infrastructure soon intersected with a new international institution. The OECD Convention, signed in December 1960, committed the organization to policies aimed at high sustainable economic growth and employment, rising living standards, and financial stability.

Read the text carefully and it does not reduce success to national product. Growth appears alongside employment, living standards, and stability. That is precisely the point: expansion is being positioned as a central means to a wider set of political ends.

In 1961, the OECD's first Ministerial Council went further. Its twenty member countries adopted a collective goal of increasing real national product by 50 percent between 1960 and 1970—roughly 4.2 percent average annual growth.

At that point, national output was no longer merely a way to describe the past. Its future rate had become an explicit policy target.

A decade-long target can organize decisions across government. Education is discussed in terms of future productivity; investment in terms of capacity; trade in terms of markets; fiscal policy in terms of demand. A single number begins to align policies that otherwise answer to different objectives.

It also changes political expectations. Weak growth becomes more than disappointing news; it becomes a shortfall from the expected path. Economic policy increasingly asks what caused the slowdown and what might restore the desired rate.

The idea of potential output follows naturally. Policymakers ask not only what the economy produced, but what it could produce if labor, capital, and productivity were fully used. The gap between actual and potential output becomes something to close.

That logic is powerful when more production still meets unmet needs and environmental costs remain small relative to the gains. It becomes harder to defend when the marginal damage from additional throughput rises or when social outcomes stop tracking production closely.

The importance of the OECD's 1961 target is not that it marks the official birth of a "religion of growth." It shows something more concrete: rich countries collectively adopted a desired pace of expansion over a ten-year horizon.

A synthetic measure had become a way to coordinate otherwise heterogeneous policies.

It also allowed governments to be compared across time. An administration inherited one observed rate, announced another, and could be judged on the gap. Growth entered political promises because it offered a compact measure of general economic capacity. The more plans assumed continued expansion, the more budgets, investments, and private expectations could be built around that assumption. Dependence did not arrive in a decree. It emerged as more decisions began to share the same growing future.

No government can simply order the economy to grow 4.2 percent. Shocks, conflict, innovation, and business cycles remain. But an expected rate can still become the benchmark against which policy is judged.

That is the crucial distinction: an indicator describes; a target creates an expectation; a repeated expectation can become embedded in institutions.

9. When Historical Success Becomes the Default

Why did this transformation face so little immediate resistance? Because much of the industrialized world had strong reasons to believe the model worked.

Countries followed different paths, and France's phrase "the Thirty Glorious Years" belongs mainly to Western European history. The broader pattern, however, was widespread: rising productivity, infrastructure build-out, household appliances, automobiles, heating, better health care, longer schooling, higher real wages, and expanded social protection.

Japan's transformation rested on extraordinarily rapid industrial catch-up. The United States began from a higher material base and expanded through suburbanization, automobiles, and mass consumption. European countries rebuilt destroyed infrastructure while enlarging welfare states. These were different histories, but they shared one powerful experience: expanding production often expanded real capabilities too.

Success then resets the baseline. A product that begins as a luxury can become standard and eventually part of the infrastructure of ordinary life. Telephones, cars, and household appliances reorganize where people live, work, shop, and spend their time. Once institutions adapt around them, lacking the product can itself become a disadvantage.

That material history sets up Chapter 2. It changes expectations before we even reach the psychology of status, comparison, and adaptation.

Growth can therefore change the practical baseline of daily life. Roads, jobs, housing, and retail can reorganize around levels of mobility and household equipment that would have seemed extraordinary a generation earlier.

Success becomes self-reinforcing. Growth does not just add goods; it changes the environment in which those goods become useful, expected, or necessary.

For a family that remembers rationing or inadequate housing, a first refrigerator, washing machine, or bathroom is not an abstract symbol of consumerism. It saves labor, improves hygiene, and protects food. A car

can open access to jobs and places that were otherwise hard to reach. Material expansion can carry enormous functional value.

That experience leaves behind a memory of progress. A generation that sees production rise may also see its real capabilities expand. The connection feels culturally obvious because, for a time, it was materially true.

But the value of the next increment changes. First access to hot water is not the same as buying a third screen. Building the first sewer system is not the same as replacing infrastructure that still works. Housing a family that lacks a home is not the same as adding another vacation property in an already constrained market.

A monetary aggregate cannot distinguish those functions by itself. It records production. Politics still has to decide whether the extra output actually expands human capabilities.

That is where historical success turns into inertia. A strategy formed during reconstruction and catch-up can retain its prestige after the dominant problems have shifted toward saturated stocks, ecological externalities, unequal consumption, or lack of time.

A house without a roof needs a roof. Once the house is complete, adding floor after floor is not automatically an improvement. A construction statistic, however, rises with every addition.

The challenge for a mature economy is not to regret that it grew. It is to recognize when additional quantity yields little additional capability—or begins to reduce it.

History cannot answer that question on its own. We will need distinctions among needs, satisfiers, material effects, and distribution. The rest of the book develops them.

What history can already show is more limited and more useful: a norm created when additional production solved enormous problems can survive after the problems have changed.

10. From Progress to Dependence

We can now see how the shift happened without inventing either a conspiracy or a law of nature.

Industrialization first made sustained increases in output per person possible, changing what people could expect from the future. The Great Depression then created pressure for a national measure of economic activity. World War II made both measurement and productive capacity matters of strategic survival.

After 1945, reconstruction gave expansion an immediate social purpose. Full employment and rising productivity tied growth to job security. Distributional bargains became easier when a larger total allowed several groups to gain at once.

Cold War rivalry added national power. Development policy added the language of catch-up. United Nations accounting standards made economies easier to compare. The OECD then placed growth inside a formal set of policy goals and attached a collective numerical target to it.

Every step made sense in its own context. Together, they created the imperative.

The sequence is straightforward: the technical capacity to produce more → the experience of material progress → national measurement → crisis management and wartime mobilization → reconstruction and employment → distributive compromise → international comparison → statistical standardization → explicit targets → expectations of continuing growth.

As growth takes on more functions, a slowdown threatens more parts of the system at once. That is how a preference can harden into dependence.

This is why political actors with very different goals can all end up asking for growth. Governments may want revenue for hospitals. Unions may want jobs and wage gains. Businesses may want markets for investment. Advocates of green growth may want resources for the energy transition. The same word becomes a vehicle for different ends.

That versatility makes the growth imperative resilient. Showing that GDP is not happiness does not solve the employment problem. Showing that work can be shared does not solve the retirement problem. Removing one argument for growth leaves the others intact. The critique therefore has to ask what function each appeal to growth is serving.

It also has to separate the level of production from its rate of change. A rich economy can produce an enormous amount with little annual

growth; a poor economy can grow rapidly from a very low base. The growth rate alone tells us neither whether basic capabilities are adequate nor whether ecological pressures are sustainable.

This distinction points toward the book's central claim. Moving beyond productivism does not mean treating contraction as a good in itself. It means ending the assumption that expansion is the default solution, then rebuilding the functions that currently depend on it.

An objective is something a society can choose. A dependence exists when abandoning that objective automatically creates costs because other institutions have been organized around its continuation. Degrowth therefore cannot mean simply changing the sign in front of the growth rate. It has to identify and replace the functions expansion has come to carry.

That genealogy remains testable. If states had already been widely targeting standardized annual growth rates long before modern national accounts, the historical novelty claimed here would need to be narrowed. If standardization played no meaningful role in the spread of growth targets, the chain from measurement to comparison to targeting would need revision.

Statistical standardization is not being offered as the single cause of growth dependence. It is one enabling condition among several. Dependence emerges when a common metric combines with institutions, expectations, and social bargains that use future expansion as a stabilizer. This explains convergence without reducing history to one cause.

The evidence supports a more modest conclusion: the contemporary growth paradigm did not begin on a single date. It consolidated strongly between the 1930s and the 1960s as national statistics, industrial experience, depression, war, reconstruction, geopolitical rivalry, and development policy converged.

That history changes the critique. We do not move beyond the paradigm by announcing that GDP is not happiness; its limits were known from the beginning. Nor do we get there by pretending growth never delivered anything. It built and financed real capabilities.

It also changes strategy. Growth became powerful because it helped carry employment, security, development, national power, and distributive compromise. A critique that talks only about environmental damage

leaves those functions unanswered. It can establish that expansion has costs and still fail to answer the institutional question: what happens when expansion stops?

The rest of the book therefore follows those functions. Chapter 2 asks why the pursuit of more becomes personally compelling. Chapter 3 asks how institutions turn a preference for growth into dependence. Only after that can we ask whether physical limits and human outcomes justify replacing those mechanisms.

The harder question is not whether growth is good or bad in the abstract. It is which functions growth still performs, which can be provided differently, and where the material cost of further expansion now outweighs the benefit.

This chapter does not answer that question yet. It establishes something more basic: the modern growth paradigm is neither eternal nor arbitrary. It is a historically constructed response to real problems.

That gives the rest of the manifesto its method. Every criticism of growth has to distinguish what expansion still accomplishes, what it no longer accomplishes well, and what could perform the same function instead. Without that discipline, degrowth collapses into refusal.

One puzzle comes first. Institutions can explain why governments want growth. They do not yet explain why individuals keep wanting more—why a consumption level becomes normal, why status moves when we reach it, or why one more object can come to represent success and security.

How does an economic norm become a norm of desire?

That is the subject of Chapter 2: why we keep wanting more.

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CHAPTER 2 — Why We Keep Wanting More: Needs, Status, Norms, and Socialization

Walk into any big-box store and the contradiction is everywhere. Some things on the shelves meet obvious needs. Some genuinely make life better. Some save time or effort. Others may not have occurred to us until we saw them. And even when the purchase itself is necessary, the particular version we choose can carry another message: reliability, competence, elegance, belonging, success, autonomy. Shoes protect our feet, but they can also signal age, taste, income, group identity—or a deliberate refusal of those signals. Objects rarely serve only one function. Neither does desire.

That makes consumption harder to criticize than it first appears. Saying that capitalism simply manufactures artificial needs captures something real in some cases, but it is too crude to carry the argument. Saying that markets merely satisfy preferences that already exist is no better. Preferences take shape in bodies, families, social classes, cities, media, peer groups, price systems, institutions, and histories. That does not make them fake. It means desire never begins in a social vacuum.

This chapter is not going to sort desires into "real" and "false." Its task is to show how a growth-oriented society can make wanting more feel normal, rational, attractive, or even defensive—and then treat the resulting behavior as evidence that people naturally wanted this system all along.

The loop is easy to miss. The system responds to real motives—security, comfort, recognition, novelty, belonging—but it also rewards some motives more than others and gives them objects, prices, infrastructure, and symbols. The behavior that follows becomes evidence: consumers buy, workers compete, households borrow, firms sell. We can then mistake behavior produced within a particular environment for a timeless human preference.

None of this implies total manipulation or total innocence. It suggests a simpler discipline: before treating behavior as a deep preference, ask what

alternatives were actually available, what norms surrounded the choice, and what it would have cost to act differently.

1. When Does a Need Become a Want?

An economy has to provide what makes life possible: food, water, housing, clothing, care, basic energy, mobility, information, education, and relationships. Calling all of that "consumption" erases a politically important distinction between what sustains a decent life and what mainly serves accumulation or distinction.

But the line moves. A cellphone could once be a luxury; in many settings it is now a practical requirement for work, public services, transportation, and relationships. A car can be a status symbol in a dense city and close to indispensable in a place built without alternatives. A larger home can provide comfort, family space, a place to work, a store of wealth, and a status signal all at once.

It helps to separate four layers without pretending they are four fixed essences. A need is the capability that must be protected: eating, having shelter, moving around, staying connected. A satisfier is the concrete way that need is met. Social norms shape what counts as an ordinary or inadequate way to meet it. Infrastructure can determine which satisfiers are realistically available at all.

That distinction explains how an object can become necessary without any change in human biology. Nobody biologically needs a smartphone. But if work requires an authentication app, transit tickets move online, family life runs through messaging, and public agencies close physical service counters, not having one can create real exclusion. The need is not the phone itself. The phone has become a gateway.

Normalization usually happens gradually. A new convenience first gives some users an advantage. Organizations then redesign procedures around it. Eventually, people without it pay a penalty in time, money, or access. The object has not become biologically necessary; the surrounding environment has stopped being neutral to its absence.

That shift changes the meaning of responsibility. At first, buying the object may be a matter of convenience. Later, refusing it may cost more time, money, or coordination. What began as an option can become an admission price for ordinary participation.

Still, social infrastructure is not the same thing as fashion. Ignoring a fashion may carry a symbolic cost; lacking access to infrastructure can block a service altogether. There is a wide spectrum between the two. We do not need a perfect boundary to recognize that not all consumption plays the same role.

Cars make the point clearly. Suppose jobs, schools, stores, and health care are spread across a region while transit service is cut back. If residents then drive almost everywhere, their behavior does not prove that driving was their unconstrained preference. Part of what looks like preference has been produced by the built environment.

That constraint can later generate a genuine preference of its own. After years of driving, someone may value the autonomy, privacy, music, storage, and constant availability of a car. Calling that preference socially situated does not mean it would vanish the moment a train line opened.

But infrastructure changes the comparison. A car looks extraordinarily convenient where the bus runs twice a day; it looks different where transit is frequent and stores, schools, and doctors are within walking distance. A choice can reveal both personal taste and the structure of the available options.

The same logic applies across markets. An option can dominate because it is better, because alternatives have disappeared, or because both processes reinforce each other. Any serious analysis has to leave room for all three.

The argument also runs the other way. New satisfiers can genuinely expand freedom. A washing machine can save hours of domestic labor. A rail network can widen access to jobs and places. Medicine, computers, and prosthetics can open capabilities that did not exist before. A critique of wanting more becomes absurd if every innovation is treated as a false need.

The political challenge is harder: distinguish gains in capability from compensation for bad organization, precautionary spending, pleasure, positional consumption, and externalities—without imagining that one authority can classify every case once and for all.

A politics of sufficiency that ignores this plurality risks targeting the wrong thing. It may restrict an object whose function was to compensate for deficient infrastructure without correcting the infrastructure itself. It then turns a collective dependence into an individual fault.

Conversely, a policy that always invokes consumer freedom can preserve infrastructures that make certain choices almost compulsory. In that case, the freedom being protected is mainly the freedom to choose within an already locked-in set of options.

The relevant criterion becomes less "is this a real need?" than "what capability is being sought, what options can fulfill it, what costs does each impose, and does the individual genuinely have a practicable alternative?"

The social character of a need does not make it fictitious. Being excluded from a practice that has become infrastructural can produce real deprivation, even if that practice did not exist a century earlier. But the fact that a desire is real is not enough to conclude that it should be satisfied without limit.

We may genuinely want more space, power, speed, novelty, travel, or recognition. The political question arises when satisfying these desires uses scarce resources, causes damage, shifts costs onto others, or depends on relative positions that cannot be generalized.

This is where the concept of sufficiency takes on meaning, without yet receiving its complete political form. It does not claim to discover a metaphysical list of true needs. It asks what conditions make a dignified and free life possible, then which additional forms of consumption genuinely improve life, which compensate for avoidable insecurities, which mainly serve a relative race, and which impose costs not contained in their private benefit.

2. We Do Not Desire in Isolation

Individual preference is real. But it is not synonymous with individual origin. We learn what is desirable much as we learn a language: by observing, imitating, receiving rewards, avoiding sanctions, comparing our lives, and absorbing norms before we are even able to formulate them.

Parents, peers, school, work, media, and institutions do not dictate every choice. Nor do they always send the same message. A family may value thrift, a group of friends novelty, a profession constant availability, a cultural milieu discretion. The individual does not receive a program; they move through signals that are sometimes convergent and sometimes contradictory.

Samuel Bowles devoted a major review to endogenous preferences: the hypothesis that economic institutions can alter motivations, habits, and values. It does not imply that everything is constructed or that individuals are blank slates. It means that institutions do not always merely coordinate people endowed with fixed preferences; repeated practices and rewards can also change what becomes familiar, normal, or valued.

This perspective matters for economics because it breaks with a comfortable separation: the institution would be merely a mechanism that aggregates preferences already formed. If property rules, rewards, competition, or cooperation durably alter motivations, then choosing an institution also means, in part, choosing the behaviors it makes more likely.

Bowles does not thereby claim that a market automatically produces selfishness or that a cooperative institution mechanically produces altruism. Effects depend on contexts, incentives, and norms. It is precisely this contingency that matters for the manifesto: human nature does not provide a ready-made institutional verdict.

An institution can even shift motivation without changing the end. A person may initially help because they see it as a moral obligation, then learn to reason more in terms of monetary reward if every gesture is paid. In other contexts, payment may instead make possible an activity that was previously inaccessible. The effect of incentives is therefore not one-directional.

The objection raised by Stigler and Becker is nevertheless essential. Their analytical program shows that it is often possible to explain a change in behavior without assuming that tastes have changed. Prices, information, available time, investment in skills, or new constraints may be enough.

Take the automobile. If residents drive more after a railway line closes, it would be extravagant to infer that their taste for driving has increased. The constraint is sufficient. Conversely, if a practice that was initially little valued becomes sought after through learning, imitation, and identity investment, constraint alone may no longer be enough. The two frameworks do not cancel each other out; they become competing hypotheses to be tested locally.

This way of reasoning requires a counterfactual test. What would the same person do if relative prices, infrastructure, or information changed? If

their behavior changes sharply, the hypothesis of a fixed preference loses some of its explanatory power. If the behavior persists despite comparable alternatives, the hypothesis of a more stable taste gains weight.

In real life, such tests are rarely perfect. Individuals also anticipate social judgment, have invested in skills, and possess habits. Present choice therefore bears the trace of earlier choices. This is another reason why preference is neither purely given nor entirely manufactured.

The concept of path dependence becomes useful here without being introduced as a new doctrine: a past decision can make certain future decisions less costly. Already owning a car, knowing the roads, and living far from a station increase the likelihood of continuing to drive, even if an alternative partially appears.

2. We Never Want Things Alone

The important word is not "manufactured." It is "situated." The observed choice emerges from a person, but from a person facing certain alternatives, certain prices, certain information, certain norms, and certain costs.

Repetition can then produce a second transformation. A person begins a practice because they are constrained to do so, then acquires skills, routines, relationships, and investments that make the practice genuinely appreciated. A situated preference is not a false preference. Its history does not cancel its present reality.

We can learn to like what we first did out of necessity. Instrumental learning provides a simple analogy: an activity that is difficult at first can become a source of pleasure once skill has been acquired. Preferences are therefore not modified only by persuasion; they can evolve through practice and investment.

This possibility also complicates political debate. A society that creates a new infrastructure may, over time, create sincere preferences for the life that infrastructure makes possible. Removing it later can therefore cause a real loss even if the preference had an identifiable historical origin.

Respect for autonomy therefore requires distinguishing the history of a preference from its present value. A social origin never automatically invalidates it.

The same rule applies to social criticism itself. Explaining that a desire has a history can help us understand it; it gives no special right to the person telling that history. A sociology of desire becomes politically dangerous when it turns an explanation of conditions into a privilege to decide what others ought to want.

The same holds in the other direction. A strongly declared preference may depend on an infrastructure that conceals its cost. We can love the freedom offered by the car while at the same time hating compulsory journeys, traffic, insurance costs, or the absence of alternatives. Preferences are not always simple units.

This distinction changes the critique of growth. If preferences are assumed to be exogenous and stable, sustained increases in consumption seem mainly to reveal that individuals want more. If economic environments participate in shaping expectations, rising consumption also becomes a process of collective learning: new conveniences become normal, former options disappear, and what was once a luxury can become an ordinary condition of participation.

3. Rank Matters

There is another reason why consumption cannot be understood solely in absolute terms: we compare ourselves with others. Income buys things, but it also indicates a position. A house provides shelter, but its location places a family within a social space. A car provides transport, but certain models signal a place in the hierarchy.

Economists speak of positional goods when their value depends in part on what others possess. Experiments by Alpizar, Carlsson, and Johansson-Stenman show that this dimension is measurable without being universal. Income and automobiles appear strongly positional in some experimental settings, while leisure or automobile safety are less so.

Positionality is not a binary property. The same good can have both an absolute and a relative component. A larger house may provide a room a family needs while simultaneously signaling position. A higher salary expands purchasing possibilities while also changing rank.

This duality explains why policies aimed at positional goods must be cautious. Taxing a good because it appears ostentatious may affect functional uses. Conversely, ignoring the relative dimension can lead us to

underestimate collective races in which everyone spends more simply to maintain their position.

The distinction is decisive. If I buy better insulation, the thermal benefit can remain even if my neighbors do the same. If I buy a signal intended mainly to place me above my neighbors, the relative benefit disappears as soon as everyone follows. A positional race can increase absolute consumption without increasing average rank.

But rank itself must be broken down. Prestige describes influence voluntarily granted to someone perceived as competent, admirable, or useful. Dominance rests more on the ability to impose costs or fear. Belonging concerns conformity to a group. Income comparison is something else again.

Henrich and Gil-White distinguish prestige from dominance; Cheng and colleagues show that these two routes to rank can coexist. This plurality protects against an impoverished psychology in which every human being is assumed simply to seek domination.

A person may want an expensive watch because they genuinely like its mechanism, because they associate the brand with achievement, because their social environment recognizes it, or because they want to intimidate. The functions can overlap. The empirical difficulty lies precisely in not attributing to a single motive what may contain several.

Inequality can heighten attention to rank. Experiments by Velandia-Morales and colleagues show that a heightened perception of inequality can increase preference for status consumption within an experimental setting. This does not mean that every form of inequality automatically causes more materialism in every society. It provides a plausible mechanism: when a hierarchy becomes salient, symbols that signal a position gain value.

This logic helps explain why reducing inequality can have a psychosocial effect that goes beyond monetary redistribution. If gaps become less threatening, some of the competition to keep up may diminish. But there is no guarantee that status will disappear. Prestige can shift toward educational credentials, the body, cultural taste, environmental commitment, or available time.

Inequality also operates through expectations. The greater the gap between positions, the more costly a loss of status may seem and the more

important certain signaling goods may become. This does not mean that people consciously calculate their rank with every purchase; hierarchy can be translated into neighborhood, professional, or generational norms.

3. Status Changes the Meaning of "Enough"

A post-growth strategy that seeks to redirect prestige must accept a limit: it does not control culture. It can alter rewards and institutions, but it cannot guarantee that individuals will value exactly what the program considers desirable.

Sufficiency itself can become a marker of distinction. Expensive organic food, a high-end bicycle, or slow vacations in a privileged setting can serve as status markers. It would therefore be naive to believe that a post-growth society would abolish hierarchy simply by changing the objects.

The realistic problem is not to abolish all status. It is to reduce the extent to which competition for rank requires a continuous increase in material flows, and to prevent access to essential capabilities from itself depending on a positional race.

This distinction avoids another mistake: believing that a materially more restrained world would necessarily be psychologically less competitive. A society can sharply reduce resource use while retaining fierce hierarchies in education, reputation, the body, or access to certain experiences. Material sustainability and symbolic equality are related but distinct problems.

The role of economic policy is therefore limited but real: to reduce situations in which access to a minimum social standing requires ever-increasing material expenditure. When self-esteem or social participation depends on a costly race, institutions can act on the structure of competition without pretending to abolish the desire for recognition.

The distinction from security is essential. A household may seek a higher income not to surpass its neighbors, but because it has no margin in the event of a breakdown, illness, or rent increase. Interpreting every demand for "more" as status would be just as false as ignoring status altogether.

4. What Scarcity Does to Choice

Critiques of materialism become especially unfair when they forget scarcity. For someone with substantial wealth, "more" may mean a marginal upgrade. For someone with no buffer, the same word may mean

avoiding an overdraft, heating the home properly, or surviving an unexpected bill.

Research on poverty and decision-making asks what insecurity does to attention and judgment. Mani and colleagues helped popularize the idea that poverty-related concerns can consume cognitive resources. Later work, including Ridley's synthesis and a more recent NBER review, warns against reducing the evidence to one mechanism.

The popularity of the "bandwidth" metaphor sometimes made a single explanation sound settled. More recent reviews point to a more complicated picture. Poverty often comes with stress, poor sleep, uncertainty, health problems, stigma, weak insurance, and repeated choices among bad options. Several of those conditions can affect attention and mental health.

That methodological caution matters. When a poor person makes a choice an outside observer considers suboptimal, we cannot automatically infer a cognitive deficit. The decision may make sense under different information, a shorter horizon, or risks the observer never has to bear.

Social policy should reduce real scarcity before trying to correct the preferences scarcity may produce. That matters especially for sufficiency: confidence that essential needs will still be met tomorrow can make it easier to give up precautionary accumulation today.

The safer conclusion is interactive rather than singular: stress, mood, mental health, attention, uncertainty, and repeated trade-offs can reinforce one another. Someone constantly deciding which bill to postpone or whether one purchase will make rent impossible is not inherently less rational. They are making more high-stakes decisions with less room for error.

That difference matters politically. Asking someone who already lacks security to give up a margin of safety is not equivalent to reducing a genuinely superfluous use for someone with abundant alternatives.

Scarcity can also change how the future is valued. Immediate spending may be rational when tomorrow is uncertain. Saving can become a form of self-protection. A more reliable car may be enormously valuable if one breakdown can cost a job. The same purchase can look like comfort from the outside and risk management from within.

Absolute deprivation and relative comparison also have to be kept separate. They can coexist. Someone can lack essential resources and still feel status pressure; neither mechanism cancels the other.

Research on materialism and well-being adds another layer. Dittmar and colleagues found a robust association between materialistic orientation and lower personal well-being. A newer meta-analysis on social well-being points to a two-way relationship: materialism can erode relationships, while weaker relationships can in turn make possessions more psychologically attractive.

That two-way relationship rules out a simple morality tale. Materialism can contribute to poorer relationships and also compensate, in part, for relationships that are already fragile. Telling people to choose better values does not address either side of that loop.

Recent work also suggests that materialistic values can raise expectations placed on close others—success, appearance, ambition—and contribute to conflict. Again, this is a specific mechanism, not a universal law of relationships.

For degrowth, the larger point is this: the more insecurity and social comparison a society produces, the more psychologically costly it may be to tell people simply to "want less."

5. Advertising Shapes the Environment of Desire

Advertising is an obvious suspect, but it is too simple to make it the sole culprit. Firms spend money to make products salient and desirable. They repeat images, tie brands to identities, run promotions, and keep certain options in front of us. None of that means they create human motivation from nothing.

Advertising can do several different jobs. It can tell people that a product exists or what it costs. Repetition can make the product easier to recall. An ad can attach emotion or identity to it, make a behavior look normal through constant visibility, or symbolically differentiate products that are functionally very similar.

One campaign can do several of those things at once. It can announce a price, borrow prestige from a celebrity, suggest a social norm, and keep the brand top of mind just before a purchase. Talking about "the effect of

advertising" as though there were only one effect hides the mechanisms that actually matter.

The attention economy makes that distinction important. A brand does not have to persuade someone deeply to affect behavior. Simply coming to mind first at the moment of choice can increase the chance of purchase. A tiny effect on one person can become economically large when repeated across millions of decisions.

Consumers are not blank surfaces. Budget, taste, skepticism, family norms, past experience, and competing offers all filter what advertising can do.

Those functions also carry different moral and regulatory questions. Telling people that a product exists or costs less serves an ordinary market function. Lying about what it does, or deliberately exploiting a vulnerability, is different. Associating a drink with social success lies somewhere else again: it is not simple information, but neither is it coercion.

The evidence is especially informative for children. In a longitudinal study of 466 Dutch children ages eight to eleven, Opree and colleagues found a sequence consistent with advertising exposure increasing desire for advertised products, which in turn predicted materialism. That does not show that advertising creates a child's entire materialistic orientation. It identifies one specific pathway.

Buijzen and Valkenburg likewise review research linking television advertising with materialism, purchase requests, and parent-child conflict. Adult effects are harder to isolate because adults also select their media, bring longer personal histories to the encounter, and face many competing influences.

Causality has to be handled carefully. If more materialistic people also seek out particular kinds of content, correlation between exposure and materialism cannot tell us that exposure caused the whole pattern. The defensible conclusion is narrower: advertising influences behavior, but the size and form of that influence depend on the audience, context, and mechanism.

Advertising also has a systemic role beyond any single message. A firm in a competitive market has reason to remain visible. A brand that stops communicating altogether may lose sales to rivals. Each company can

therefore have a perfectly rational reason to intensify demand even when the collective result is a constant rise in commercial noise.

A firm might even prefer a world in which every competitor advertised less while still finding it too risky to cut its own spending first. The pattern is not universal, but it shows how individually rational choices can become collectively difficult to unwind.

The same logic helps explain symbolic product renewal. When functional performance changes little, aesthetic, narrative, or status differentiation can create a fresh reason to buy. That does not make all innovation artificial. It shows that novelty also performs a commercial function.

Policy has to distinguish among information, competition, and commercial pressure. Banning all advertising would also make it harder for new products and firms to reach consumers. Refusing all regulation, however, treats attention as though its use could never impose a social cost.

And advertising is only one part of the environment. Workplaces, peers, cultural media, storefronts, retail design, and professional expectations all organize attention. This chapter stops short of a theory of digital platforms, recommendation algorithms, or microtargeting; those require their own analysis.

The claim should remain modest: advertising does not create human desire. It helps structure the environment in which desire is activated.

Socialization Has No Central Planner

We learn norms through institutions that are neither coordinated nor consistent. Family, school, peers, work, and media can reward different things. That makes socialization diffuse and resilient—and much harder to identify than centralized propaganda.

No one has to issue a command for a norm to take hold. Thousands of small decisions—hiring, imitation, location choices, advertising, family conversations—can converge on the same social expectation.

The result can look like collective intent even when nobody designed it. Parents seek reputable schools to protect their children; employers use credentials to reduce uncertainty; students accumulate qualifications to remain competitive. Each choice makes sense locally, while together they can inflate the requirements everyone faces.

This mechanism matters throughout the book: a system can reproduce itself without any one actor wanting the system as a whole. Local motives line up through their effects rather than through a shared plan.

Norms can also outlive the reason they began. A dress code that started as class distinction can harden into ordinary professional convention. A consumption pattern born from a useful innovation can persist after other tools can provide the same service.

Culture usually moves more slowly than prices. A tax can change overnight; what a group regards as normal may take a generation to shift. Any transition has to operate across those different time scales.

Consider clothing. One family may see an item as too expensive; a peer group may read it as belonging; a profession may treat a particular style as credible; another social setting may regard an expensive logo as vulgar. The object carries no single intrinsic social meaning. Its meaning comes from the recognition system around it.

Norms travel through several channels: explicit sanctions such as ridicule, exclusion, or a lost promotion; imitation of people we identify with; skills that become pleasurable as we learn them; and sheer repetition, which makes a familiar option easier to imagine choosing.

None of this programs people. Individuals resist, combine norms, and build countercultures. But resistance often uses the very codes it rejects. Deliberately refusing a brand can itself become a group signal.

Work matters because it distributes more than income. It organizes schedules, status, professional identity, and expectations of availability. People may spend money to gain access to a profession, recover from exhaustion, or display forms of competence their workplace expects.

That can make apparently luxurious spending partly instrumental. A job that demands a certain appearance, constant availability, or mobility can impose costs an outsider sees only as consumption. Their meaning changes when viewed against the professional norm.

Work also allocates time. Someone with high income and little free time may purchase services that substitute for domestic labor. Shorter working hours could reduce some kinds of spending and increase others. Consumption volume never has a single cause.

This is where psychosocial norms reconnect with the rest of the economy. They do not float above employment and income; they are partly organized through them.

School can shape comparison without ever teaching consumption. Credentials, rankings, and educational tracks can expand real capabilities while also generating races whose value depends on relative scarcity.

Socialization, then, is an environment of constraints and meanings rather than a single apparatus. That matters for sufficiency policy: changing advertising alone will accomplish little if infrastructure, work, and status competition keep pushing the other way.

6. Competition and Cooperation Are Both Human

Debates about consumption often smuggle in a theory of human nature. One side says people are naturally competitive. Another says people are naturally cooperative and corrupted by markets. Neither story is rich enough to build institutions around.

People cooperate, compete, imitate, punish, share, and cheat. Politics does not need to discover which one is our true essence. It needs to understand which behaviors particular institutions reward, discourage, or make necessary.

Economic life already mixes the two. Rival firms share technical standards. Cooperative communities compete for scarce resources. Public agencies use performance incentives. "Markets" and "cooperation" are not expressions of two separate human psychologies.

Experiments on social norms show that people often adjust behavior to what they think others commonly do or approve of. That gives institutions leverage: change the perceived norm and behavior can change with it. The same mechanism can also spread harmful practices when they appear dominant.

The dangerous inference is circular: people behave competitively, therefore competition must be their nature. The right question is what rules made that behavior rewarding, expected, or necessary.

Markets themselves illustrate the point. Firms compete for customers while depending internally on extraordinary levels of cooperation—contracts, trust, teams, accounting standards, public infrastructure,

payment systems, and property law. Without shared rules and a baseline of trust, competition becomes too expensive to work.

The reverse is equally true. A cooperative or a commons does not eliminate opportunism. It still has to decide who contributes, who may leave, how abuse is handled, how disagreements are resolved, and how tasks are shared. Serious cooperative institutions do not assume morally perfect participants.

Research on social norms likewise shows that cooperation depends strongly on what people believe others do and approve of. Context shapes behavior without fully determining motivation.

That flexibility creates a self-confirming trap. An institution heavily rewards competition; people learn to compete; observers see competitive behavior and call it human nature; the institution is then defended by behavior it helped produce.

The opposite mistake is possible too. A highly solidaristic community may make cooperation look spontaneous even when it depends on norms, history, reputation, and sanctions.

Degrowth cannot rest on the invention of a cooperative "new person." It has to work with people capable of cooperation and defection, altruism and self-interest, status seeking and solidarity.

7. When Institutions Manufacture Their Own Evidence

We can now state the chapter's central loop.

A rule or infrastructure makes certain behaviors easier, more profitable, or more necessary. Those behaviors become common. What is common begins to look normal. Institutions then read that normality as preference and invest further in the conditions that produced it.

Cars provide the clearest example. Build roads, spread services farther apart, and weaken transit; residents buy cars. High car ownership is then taken as proof that people prefer driving, which justifies more road investment. Dependence helps produce the revealed preference that then deepens the dependence.

The feedback continues. The more households own cars, the easier it is for stores and services to locate on the assumption that customers can drive. As

they do, cars become even more useful. The installed equipment changes the environment in ways that increase the value of the equipment.

Breaking that loop sometimes requires acting before observed preferences change. A transit line may need to exist before many people can reveal a preference for using it. Waiting for spontaneous demand before building any alternative can lock a society into the path it already has.

That argument does not justify every public investment. It only means that demand observed inside a locked-in system is not always a neutral measure of what people would choose under a different set of options.

Credentials can create a similar feedback loop. When employers use degrees as screening signals, more people pursue them. As credentials become more common, employers can raise the minimum simply to distinguish applicants. Some education still builds real skills; another part becomes a positional race.

A digital platform offers a third, limited example. If friends, work, and certain services migrate to a platform, not using it becomes costly. Widespread use can then be interpreted as a pure preference for the platform. The chapter draws no conclusions here about algorithms; it shows only how an infrastructure of participation can turn a choice into a near-necessity.

This loop helps explain why a system can seem to confirm its own assumptions about human beings over and over again. Individuals behave in the way the rules make rational; those behaviors then become the argument in favor of the rules.

It also helps explain why a simple information campaign often fails. Telling someone that they could live differently does not change the price of housing, the distance to work, the hiring criterion, or the norm of access. Knowledge can change an intention while leaving the operative institutional thought intact: "I would prefer to do otherwise, but I cannot afford it."

At the collective level, the contradiction becomes visible: people may support reducing pressures in general while individually continuing to reproduce the behaviors that secure their position within the current architecture. This is not necessarily hypocrisy; it is sometimes the difference between a normative preference and a practical constraint.

We must nevertheless avoid the opposite excess. An institution does not create every motivation. A car can genuinely provide pleasure and autonomy. A credential can genuinely increase skills. A platform can genuinely facilitate relationships. The loop concerns the share of behavior whose probability is increased by the environment, not the entirety of desire.

This distinction becomes decisive for any transition policy. If a society wants to reduce certain behaviors, it must change their choice environment rather than merely explaining to people that they should want something else.

Changing infrastructure can even alter stated preferences afterward. A person who discovers a reliable rail journey may learn to prefer that mode; another may continue to prefer the car. Policy does not need to predict future tastes. It must make several forms of life genuinely possible.

8. The Liberal Objection: Who Gets to Decide What We Should Want?

The argument creates an obvious political danger. If preferences are shaped by context, governments can claim to know people's "real needs" better than people themselves. They can dismiss disliked choices as false consciousness and impose a preferred vision of the good life in the name of liberation.

That is not a minor objection to sufficiency. It is one of the strongest, and any serious theory has to face it directly.

Consumer sovereignty protects an important democratic intuition: people often know more than experts about what their own choices mean to them. Pleasures differ. Something a planner dismisses as frivolous may carry deep aesthetic, relational, or identity value for the person using it.

Several concepts have to remain separate: influence, manipulation, coercion, information, and externality. Influence is not automatically manipulation. Advertising is not automatically fraud. A social norm is not automatically coercion. And a preference does not become invalid simply because it was influenced.

Politics already shapes the menu of choices. Governments build roads, set building codes, fund schools, regulate dangerous products, police deceptive

advertising, define property rights, and provide infrastructure. There is no pre-political marketplace where untouched preferences simply meet neutral offers.

So the relevant democratic question is not whether public institutions influence choice. They already do. The question is which forms of influence and constraint can be justified in public.

Some categories are relatively clear. Externalities matter when private consumption imposes substantial costs on others. Information rules can target fraud and deception without judging what consumers enjoy. Public infrastructure can expand access by creating alternatives rather than prescribing one choice.

Vulnerability is another category. Children, some dependent people, and groups facing severe information asymmetries may warrant stronger protection. The principle has to remain proportionate: protecting vulnerability is not permission to treat all adults as incapable of choosing.

Market power matters too. When a small number of actors control infrastructure required for participation, consumer choice may be less free than it appears. This chapter does not develop a theory of digital platforms; it only retains the general principle.

Policy can also change the options rather than the preferences. Better transit, efficient housing, or a shared service can expand what people can realistically choose without requiring everyone to embrace the same ideal of the good life.

The line should be firm when policy tries to "correct" a preference merely because officials regard it as shallow or commercially influenced. Explaining how a desire was shaped does not authorize the state to rank acceptable ways of life.

Paternalism becomes especially risky when decision-makers carry their own class norms into the analysis. Mass-market consumption may look vulgar to an expert while prestigious but resource-intensive forms of consumption escape scrutiny. Sufficiency policy has to apply the same criteria across social groups.

The strongest grounds for intervention concern the consequences and conditions of choice, not the supposed nobility of the preference:

externalities, shared scarcity, deception, vulnerability, lack of alternatives, and concentrated power.

The same rule protects cultural minorities. A practice can look inefficient to the majority while carrying substantial identity or relational value. Ecological costs may justify debate over how the practice is carried out; they do not erase its cultural meaning.

And every restriction needs a revision rule. If a policy sold as sufficiency persistently reduces people's real autonomy without producing demonstrable ecological or social gains, it should be changed or abandoned. Good vocabulary does not make a bad constraint legitimate.

Degrowth must not become a police force for desire. Its task is to make a decent life possible with less dependence on material accumulation while leaving room for many ways of living inside common limits.

That principle is less comforting than a morality tale about simplicity. It requires building alternatives, measuring externalities, tolerating disagreement, and accepting that people will continue to value things other people consider frivolous.

9. What This Means for Degrowth

The psychosocial argument in this chapter does not prove that degrowth is necessary. It shows that economic motives are partly relational and contextual. It does not tell us what level of production is sustainable, settle the decoupling debate, or identify which industries should shrink.

What it does is rule out several bad conclusions.

First: because consumers keep buying more, indefinite growth must simply express fixed human nature. The evidence does not support that inference. Behavior is too sensitive to norms, insecurity, inequality, infrastructure, and institutions.

Second: all we need is to persuade individuals to practice restraint. That fails whenever people remain trapped by housing far from work, inadequate transit, fragile social protection, or jobs organized around income and status.

Third: advertising explains everything. It does not. Advertising amplifies and organizes motivations that exist within a much larger system.

Fourth: if preferences are socially shaped, the state may choose the "right" preferences for everyone. It may not. Recognizing the social formation of preference raises the democratic burden; it does not eliminate it.

Fifth: materialism is merely an individual moral failure. The evidence points instead to a complicated relationship among material values, well-being, relationships, insecurity, and comparison. A society can strengthen materialistic orientations while also producing the insecurity and status competition that make them attractive.

The constructive implication is more demanding. A politics of sufficiency has to work on at least four layers at once.

First, secure the basics so that "less" does not mean insecurity: income, housing, health, energy, mobility, and access to essential services.

Second, reduce inequalities that turn social life into a constant status comparison and make ordinary security extraordinarily expensive for people with the least.

Third, change infrastructure that makes resource-intensive behavior compulsory. A credible alternative usually matters more than a moral lecture.

Fourth, regulate commercial systems that profit from keeping demand permanently unsettled—without eliminating the useful informational role of markets or pretending that all social influence can be neutralized.

None of those layers can substitute for the others. Tighter advertising rules do not solve mobility in a city designed around cars. Excellent transit does not erase status competition in a deeply unequal society. Cash redistribution does not by itself fix polluting infrastructure.

A post-growth society also has to assume that people will keep seeking status, pleasure, novelty, comfort, and recognition. The goal is not to manufacture a new ascetic citizen.

That sets an important limit on the project's anthropology. Sustainable institutions have to work with imperfect people—sometimes jealous, competitive, impulsive, or spendthrift. A system that requires the population to undergo complete moral transformation is fragile before it begins.

The same is true of altruism. A transition cannot assume that everyone will willingly bear costs for strangers or future generations. Institutions have to make sustainable behavior workable across a wide range of motives.

A policy succeeds less by converting citizens to sufficiency than by making it possible to live well without turning every ordinary desire into higher material throughput.

Prestige can attach to care, knowledge, sport, art, skill, contribution, or creativity just as it can attach to possession. No policy can guarantee that such a shift will be complete or permanent. Material limits therefore have to work without moral perfection.

That brings us to the next question. If the desire for more reflects real human motives but is also shaped by the institutions around us, we need to understand those institutions.

Why do employment, debt, taxation, firms, investment, and the state become dependent on growth? Why can a society recognize that some material flows need to fall and still treat an economic slowdown as a crisis?

Psychology explains why people participate in the system. It does not yet explain why the system itself is so hard to stabilize without expansion. That is the subject of the next chapter.

Methodological Notes and Limits of the Evidence

Meta-analyses continue to find a robust association between materialism and lower personal well-being. Newer work on social well-being strengthens the case for a two-way relationship between materialism and relational quality. None of this supports the crude claim that "consumption makes people unhappy."

Evidence linking advertising and materialism is more directly causal or longitudinal among children than among adults. Positional effects vary substantially by good. Research on poverty and cognition should be read as evidence for a family of mechanisms—stress, attention, affect, repeated trade-offs—not as proof that poverty produces a fixed cognitive deficit.

The disagreement between stable and endogenous accounts of preference remains open. This chapter treats that tension as analytically important rather than pretending it has been resolved.

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CHAPTER 3 — Why Modern Institutions Depend on Growth

An economy can stop growing without violating any law of physics. Buildings do not vanish. Machines can still be maintained. Crops still grow. People still need food, housing, health care, and human attention. Yet a prolonged slowdown in a modern economy rarely feels like simple stability. Layoffs rise, investment gets postponed, tax revenue weakens, debt becomes harder to carry, governments reach for stimulus, and firms worry about losing ground. This chapter asks why.

It is tempting to say simply that "the system needs growth." The phrase is memorable and analytically weak. Which system? What kind of growth? Needed to preserve what? A debt-free family business does not face the same constraints as a public company. Social Security does not operate like a mortgage. A hospital does not have the same productivity dynamics as a semiconductor plant. If growth keeps returning as a political necessity, we need to identify the mechanisms one by one.

1. Growth Dependence Is Built, Not Natural

The first distinction is basic: institutional dependence is not physical necessity. A society needs energy, materials, food, infrastructure, and human labor to reproduce the conditions of life. It does not inherently need the dollar value of everything it produces to rise every year. Particular institutions can make continued expansion useful, convenient, or at times close to necessary for stability.

A rigorous diagnosis of growth dependence starts by naming four things: the system being studied, the measure of growth, the function we want to preserve, and the mechanism connecting the two. A labor market may rely on output growth to sustain employment under one set of rules. A public budget may rely on tax bases that expand with income and spending. A leveraged firm may need enough cash flow to refinance debt. These dependencies can reinforce one another, but they are not the same dependency.

Recent work sharpens the point further by asking about the unit in which growth is measured, the relevant threshold, and the exact function at

stake. That discipline matters. Without it, almost any correlation between growth and a social outcome can be mislabeled a "dependence."

Take three examples. If employment repeatedly deteriorates below a certain growth rate under a given institutional setup, that labor market may be growth-dependent in that specific sense. If a retirement system remains balanced at zero growth because its parameters adjust, it may not share the same dependence. If a leveraged company needs rising revenue only long enough to cross a refinancing wall, the dependence is temporary and conditional, not a permanent law.

The protected function also has to be explicit. Are we trying to preserve the number of jobs, household income, hours worked, retirement benefits, or quality of care? A system can look stable on one measure and fail on another. "Growth dependence" means nothing until the function is defined.

The useful definition is therefore narrower: an institution is growth-dependent when, under a given configuration, sustained positive growth is required to preserve a function we have chosen to protect. The definition matters because it leaves open the possibility of changing the configuration.

That reframes the entire post-growth problem. The question is not how to force an economy that wants to grow to stay small. It is which functions growth currently performs and how those functions could be maintained when further material expansion is no longer desirable or possible. A post-growth economy cannot be today's economy with a few percentage points of GDP removed. It has to change the mechanisms that turn stagnation into crisis.

2. Productivity Saves Time. Institutions Decide What Happens to It

Suppose a company can now produce in eight hundred hours what once took a thousand. That can be excellent news: lower costs, less strain, more free time, or the same output with less effort. Nothing about the productivity gain itself says the company must produce more.

The social result depends on where the two hundred saved hours go. If employees keep the same pay and work less, the gain becomes time. If

wages rise, it becomes income. If the firm keeps the gain, it becomes margin or profit. If employment falls, the gain becomes a threat to people whose access to essential goods still depends heavily on wages. The technology does not decide among these outcomes. Institutions do.

A simple example makes the choice visible. One hundred employees each work one thousand hours to produce one hundred thousand units of service. A 20% productivity gain makes the same output possible with eighty thousand hours. Twenty thousand hours have been freed. They can become shorter schedules, more output, fewer jobs, better quality, or some combination.

If demand rises by 20%, the firm can keep its workforce and sell more. If demand is flat and schedules stay fixed, roughly twenty full-time equivalents become redundant. If hours fall by 20% while monthly pay is protected, some of the productivity gain has to show up in hourly compensation. No answer is contained in the machine.

At the level of one firm, the arithmetic is straightforward. Across an economy it becomes dynamic: prices change, new sectors appear, wages become other people's demand, and workers move between industries. That is one reason productivity and employment have often risen together rather than moving in opposite directions.

American labor-market institutions already show that hours and employment do not have to move together mechanically. Short-Time Compensation, or work sharing, allows participating employers in eligible states to reduce hours instead of laying off part of the workforce, with unemployment insurance replacing part of the lost pay. The program is limited and cyclical, not a post-growth model, but it is enough to show that "less output growth means fewer jobs" is not an institutional law.

That example strengthens rather than weakens the argument. If employment can be protected through shorter hours, different work rules, or growth in other sectors, then the labor market's dependence on aggregate expansion is partly a product of institutional design. It is real, but it is not eternal.

Growth often acts as an absorber. When each worker can produce more, rising demand lets firms sell more without cutting employment as sharply. But productivity does not mechanically destroy jobs, either. More productive firms can lower prices, gain market share, invest, pay higher

wages, and hire. The relationship depends on demand, competition, wages, and institutions.

The harder question appears when some material volumes should stop growing. If employment has been maintained partly because productivity gains are turned into ever-larger sales, those gains need another destination: shorter hours, shared jobs, higher hourly pay, lower prices for essential goods, maintenance, or better quality. The problem is not productivity. It is an institutional habit of turning saved time into more throughput in order to avoid unemployment or lost income.

Shorter working time is therefore a policy option, not a mathematical identity. Historical reforms and four-day-week trials show that hours can fall without a one-for-one loss of output or employment in some settings. But many trials are voluntary, sector-specific, and run in organizations already prepared for the change. Local success does not prove that every sector can cut hours by 20% at no cost.

The challenge is sharper in labor-intensive services. Software may let an accountant handle more files. It is much harder to double the amount of meaningful human attention a caregiver provides without changing the service itself. Any work-sharing strategy has to respect those sectoral differences.

That is why employment remains a central political constraint. Recessions often damage labor markets even though the exact relationship varies across countries and institutions. Growth does not guarantee full employment. But in an economy where wages remain the main route to income, an unprepared slowdown can still make jobs and household security deteriorate together.

3. Must a Business Grow to Survive?

Taken literally, "grow or die" is false. Small manufacturers, professional practices, family businesses, cooperatives, local retailers, and niche firms can remain roughly the same size for years. Many owners value independence, steady income, quality, or continuity more than maximum expansion. Growth is not an intrinsic property of a business.

Pressure emerges when several constraints line up. High fixed costs can reward volume. Heavy debt requires cash flow. Equity investors may price a company on expected earnings growth. Competitors may cut costs

through scale or new technology. In those settings, expansion can become defensive rather than ideological.

That produces very different business models. An owner-operated firm with little debt can aim for stable income. A mature family company may finance replacement investment from retained earnings. A public company may face continuous scrutiny of growth expectations. A platform business or capital-intensive industry may chase scale because additional volume lowers average cost.

Revenue growth is not the same thing as material growth. A company can earn more by improving quality, raising prices, adding maintenance, or selling services rather than more physical units. A materially post-growth economy does not require every nominal revenue figure to freeze.

Competition is equally contingent. A stable firm can survive in a stable market. But if competitors adopt technology that sharply lowers their costs, standing still may mean losing customers and eventually losing the ability to finance replacement. Growth can become a defensive response to the structure of competition.

Investment makes the mechanism visible. Firms commit resources today because they expect future productive capacity, revenue, or savings. Some investment merely replaces worn-out equipment. Some reduces pollution, saves energy, secures supply, or improves working conditions. None of those necessarily increase output. But many projects still depend on expected future revenue, so weaker sales expectations can push them out of the budget.

U.S. credit conditions make the point without relying on a European example. The Federal Reserve's July 2026 Senior Loan Officer Opinion Survey found that banks had left standards for commercial and industrial loans broadly unchanged in the second quarter, while demand strengthened among large and middle-market firms and was roughly unchanged among small firms. The details move over time; the relevant mechanism is that financing terms, borrower demand, and expected business conditions affect which investments proceed.

The logic is simple. An investment spends resources today in exchange for an uncertain future flow. When expected sales weaken, expansion projects can disappear quickly. Maintenance or pollution-control projects may

remain necessary, but financing them can still become harder when cash flow tightens.

Uncertainty adds another channel. Firms may wait for clearer conditions; lenders may become more cautious at the same time. Each decision can be individually reasonable while their combined effect reduces investment and confirms pessimistic expectations.

That loop can be interrupted. Public investment, guaranteed demand, long-term contracts, or patient finance can keep useful projects moving through weak conditions. Once again, the outcome depends on institutional design rather than on a universal law.

This is how weak expectations can become self-reinforcing. One company postpones investment because the outlook is uncertain. Its suppliers lose demand. They revise their own outlook and delay hiring or investment. No single firm intends to create stagnation, but coordinated caution can deepen it.

The strongest objection remains valid: firms can be profitable without permanent growth. Capital can be maintained, durable products repaired, cooperatives can distribute surpluses, and owners can accept steady returns. The implication is not that stable firms are impossible. It is that a post-growth economy must make stability financially viable under its rules of ownership, finance, and competition rather than simply ask existing firms to stop expanding voluntarily.

4. Debt Does Not Require Growth—but It Can Make Stagnation Fragile

One familiar argument says that interest-bearing debt mathematically forces the economy to grow because borrowers must repay more money than they received. That claim is wrong. Interest payments redistribute income; money received by a creditor can recirculate; debt can be amortized, refinanced, restructured, or written down. Interest does not create a universal accounting requirement for aggregate growth.

Rejecting the bad argument matters because the stronger mechanism is institutional. Debt is a claim on future income. A borrower can service that claim in a growing, stationary, or even mildly contracting economy if income remains sufficient. Trouble begins when households, firms, or

governments build balance sheets around the assumption that future income or asset values will keep rising.

Three things have to be separated: the debt stock, debt service, and refinancing. The stock is what remains owed. Debt service is what must be paid now. Refinancing replaces maturing debt with new borrowing. A large debt can be manageable with stable income, low rates, and long maturities; a smaller one can become dangerous after a sharp income loss or rate increase.

Leverage makes the asymmetry easy to see. If a household buys a $300,000 home with $60,000 of equity and $240,000 of debt, a 10% decline in the home's value wipes out half of the household's accounting equity. That does not automatically cause default, but it shows how a modest change in asset value can sharply reduce the margin of safety.

For businesses, fixed-rate debt may look harmless until it has to be refinanced. If rates are higher or profits lower when the maturity arrives, a viable firm may cut investment or payroll simply to preserve debt service. Vulnerability is not the same thing as permanent crisis, but refinancing can turn a slowdown into a much larger adjustment.

Household debt can amplify downturns in the same way. Research on the Great Recession shows that highly leveraged households often cut spending more sharply when income and asset values fall. The mechanism is amplification, not a mathematical need for growth.

A fixed monthly payment becomes harder to carry when a household loses income. A company faces the same problem when cash flow falls or refinancing costs jump. Borrowers then cut consumption, investment, or employment to protect debt service, and those cuts become someone else's lost income.

That is why debt-heavy booms can produce deeper contractions. When asset prices fall and incomes weaken, leveraged households and firms repair their balance sheets by spending less. Individually prudent deleveraging can become collectively recessionary.

Public debt follows a different mechanism. The relationship among effective interest rates, nominal growth, inflation, and the primary budget balance affects how easily a government can stabilize its debt-to-GDP ratio. Faster nominal growth often makes the ratio easier to manage; weak

growth combined with high rates raises the adjustment burden. That still does not mean a government literally cannot function without growth.

The standard debt-dynamics equation describes a ratio, not a law of solvency. Governments can change taxes and spending, lengthen maturities, hold assets, and operate under very different monetary arrangements. The same debt ratio can therefore imply different levels of risk in different institutional settings.

There is no universal debt threshold beyond which solvency suddenly disappears. The useful discipline is to track the actual channels: interest costs, maturity structure, currency, inflation, revenue, and the quality of the assets or expenditures financed by borrowing.

The useful point for our diagnosis is simpler: growth makes the arithmetic of many commitments easier because it increases the nominal incomes that serve as the base from which they are serviced. This creates an institutional preference for growth without making it an absolute mathematical condition.

Debt therefore reveals a general feature of growth dependence: it turns an expectation about the future into a present commitment. The more balance sheets are built on the assumption of rising incomes, the more a stationary future looks like a bad surprise rather than a chosen equilibrium.

5. Public Services and Retirement Systems Expose the Trade-Offs

Public finance makes growth dependence especially visible because it links most of the economy at once. Revenue comes from wages, payroll and income taxes, business profits, consumption, property, and wealth. When activity weakens, several bases can slow together. Spending does not automatically fall with them: unemployment support may rise, health needs persist, retirement benefits still have to be paid, and infrastructure still needs maintenance.

No government relies on one tax base. Income taxes depend on earnings; payroll taxes on wages and employment; sales and other consumption taxes on spending; corporate taxes on profits; property taxes on assessed values; environmental taxes on activities policy may be trying to reduce. A stable economy can finance public functions, but it cannot assume every base will expand automatically.

The political convenience of growth is easy to see. If real public spending rises 2% a year while the tax base is flat, tax rates, taxable bases, borrowing, or spending priorities eventually have to change. If real incomes are also rising, part of the adjustment can be absorbed by a larger base. Growth does not erase the trade-off; it can make it less visible.

That matters for distribution. Rising revenue can finance a new service without forcing an immediate argument over who pays more. Without growth, each additional commitment points more directly to a financing choice: higher taxes, a broader base, more debt, a cut elsewhere, or a real saving.

More visible trade-offs are not necessarily a defect. They can make democratic choices more honest. But they also raise the political cost of every promise and help explain why governments often prefer an expanding denominator.

A post-growth fiscal system would have to govern without assuming that tax bases keep widening on their own. It would have to distinguish services that should expand—care may be one—from expenditures or harmful flows that should shrink.

The choice of tax base therefore changes the form of dependence. Shifting taxation toward land, wealth, rents, or externalities can reduce reliance on labor income, but every base comes with distributional, behavioral, administrative, and avoidance effects. Fiscal architecture is never neutral.

This is why growth is politically comfortable. It can increase revenue without an equivalent announced increase in tax rates, reduce the relative burden of some debts, and make new spending easier to finance without presenting every gain as someone else's loss. Expansion can postpone distributive conflict.

None of that means public services are doomed without growth. Tax bases and benefit rules are political institutions. A society can change what it taxes, how it finances benefits, and what it guarantees. Weak growth does not erase real resources; it makes the distribution of those resources harder to hide.

Aging makes the underlying resource question especially clear. OECD projections show large increases in old-age dependency across advanced economies over coming decades. The exact fiscal effect varies widely

because employment, retirement rules, migration, productivity, benefit formulas, and funded reserves differ across countries.

Demography alone does not determine the number of people supported by current workers. Labor-force participation, employment among older adults, health, immigration, productivity, and retirement behavior all change the ratio between contributors and beneficiaries. Similar demographic profiles can therefore produce very different institutional pressures.

Current-pay and funded retirement systems also face different financial mechanics. One relies more directly on current wages and taxes. The other accumulates assets. But future retirees in either system will ultimately consume goods, housing, energy, health care, and labor produced in the future. Funding changes the claim on those resources; it does not create them.

That rules out a false choice between permanent growth and retirement-system collapse. The real problem is how future resources are divided between workers and retirees and how the institution translates that distribution into taxes, contributions, asset income, claiming ages, and benefits.

The demographic constraint is real; the response is political. Different systems raise contributions, change eligibility or claiming ages, adjust benefits, increase employment, or draw on funded reserves. No single variable decides the outcome.

Care creates a related pressure because need can rise even in a stationary economy. An aging population can require more hours of human care. Research on adult social care shows how rising need, productivity limits, rents, and funding arrangements can interact. Calling the whole problem a "lack of growth" hides those separate mechanisms.

Home care makes the productivity issue concrete. If the service we value is forty-five minutes of competent human attention, cutting the visit to twenty minutes may raise measured output per hour while worsening the actual service. When wages rise elsewhere, care providers still have to pay enough to recruit and retain workers. Relative costs can therefore rise even when the service has not become "less efficient" in any meaningful sense.

That is the logic usually associated with Baumol's cost disease. Care, education, and public services do not become less valuable simply because

their measured productivity rises slowly. The problem is that these sectors may still have to raise wages along with the rest of the economy, which increases their relative cost.

A string quartet still needs four musicians to perform the same piece. A class, medical visit, or care service may benefit from technology, but large cuts in human time can change the service itself. Hold wages down and workers leave; let wages keep pace and the service takes a larger share of income.

Higher education and health care show the same measurement problem. Some apparent "cost growth" reflects maintaining quality and competitive wages rather than simple managerial failure. Technology can raise productivity in particular tasks without eliminating the human-time constraint.

For post-growth, the implication is important: devoting a larger share of income and labor to care can be a rational social choice. The goal is not to prevent every relative cost increase. It is to finance valued services without assuming the whole economy must expand fast enough to conceal the trade-off.

Education presents the same tension. Digital tools can automate some tasks and expand access. But explanation, feedback, mentoring, and support still require human time. More students per instructor may raise a simple productivity ratio without delivering the same educational service.

A sufficiency economy may therefore employ more people in care, education, repair, and maintenance while producing fewer resource-intensive goods. That shift can look like weak productivity growth in monetary statistics even when it improves the functions society actually values.

6. How Growth Becomes the Default Stabilizer

The mechanisms now fit together. Productivity reduces the labor needed for a given output. Because wages remain the main route to income, lower labor demand can threaten household security unless hours or distribution change. Firms invest against expected future revenue. Credit finances activity today but creates claims on tomorrow. Government revenue depends heavily on market income and spending while many public needs do not fall when GDP does.

A simple chain shows the feedback. A household loses income and cuts spending. A supplier revises sales expectations and postpones investment. Lenders become more cautious. Hiring slows. Tax revenue weakens while demands on public support rise. Nobody chose a recession; each actor responded rationally to a signal that became the next actor's signal.

Growth can reverse several links at once: higher income supports demand; stronger demand improves expectations; investment and hiring rise; revenue strengthens; balance sheets look safer. That is why growth can function as a coordination variable even when the actors involved share no common ideology.

The same logic explains stabilization policy. When households and firms all cut spending at once, fiscal or monetary policy often tries to prevent private caution from becoming a general contraction. The legitimate goal is stabilization. The ecological question is what gets stabilized.

If every slowdown is answered by restoring aggregate production indiscriminately, policy can support both necessary activity and material flows that should be shrinking. The issue is not demand stabilization itself. It is whether stabilization can become selective enough to protect income and employment without requiring every sector to expand.

That capacity remains one of the central institutional claims post-growth still has to prove: can social stability be separated from general expansion?

The mechanism persists because it is decentralized. Governments fear unemployment. Firms delay investment when demand looks weak. Households save more when they feel insecure. Banks protect balance sheets. Each reaction can be locally sensible while the combined system generates renewed pressure for growth.

"Growth" therefore hides several different wants. A finance ministry wants a larger revenue base. A firm wants customers and margins. A bank wants solvent borrowers. A worker wants job security. A retirement system wants a sustainable funding base. Post-growth policy has to disassemble those functions rather than fight growth as though it were a single actor with a single motive.

Strong growth improves several variables at once. It can support hiring, open markets, raise tax revenue, make investment easier to justify, and reduce the relative burden of existing debt. Its political power comes partly from reducing the number of conflicts that must be settled directly.

That turns distributive conflict into a promise about time. Instead of taking from one group today to give to another, politics can hope that tomorrow's larger economy will let both gain. When the extra output fails to appear, the postponed conflict returns through taxes, wages, retirement benefits, profits, and public spending.

A stable economy would have to make more of those trade-offs explicit. That does not condemn it to permanent conflict. It means growth can no longer serve as the hidden third term that pushes conflicts into the future.

This is how growth becomes an invisible institution. No one has to issue a daily command to produce more. Workers want security. Managers protect margins. Investors seek returns. Banks want repayment. Governments want to fund hospitals without raising taxes. Retirees want reliable benefits. Those reasonable local goals can add up to a collective preference for expansion even when nobody has chosen material expansion as a civilizational end.

That is the chapter's central point. Growth dependence does not require a conspiracy. It can emerge from institutions that solve different real problems by leaning on the same adjustment variable.

7. The Strongest Objection Changes the Thesis

A defender of growth can now object: much of this sounds like a description of recession. Of course an unexpected contraction destroys jobs and weakens public finances. That does not prove a deliberately stable economy without growth is impossible. The objection is correct.

Take a city built around cars. A sudden fuel shortage creates crisis; that does not prove a city designed around proximity and transit would be in crisis with lower fuel use. Likewise, an economy organized around rising sales will experience unexpected stagnation as a shock. That tells us something about its design, not about every possible stable economy.

The same distinction applies to public services. A hospital that suddenly loses 10% of its budget experiences austerity. A hospital designed to operate sustainably on a stable budget is not therefore in austerity. Level, expectations, and institutional design matter as much as the rate of change.

At least four trajectories have to remain separate: recession, financial crisis, unprepared stagnation, and organized stability. The same GDP growth rate can appear in each and mean very different things.

A recession is an involuntary contraction inside institutions built around growth expectations. A post-growth economy, if it can be built, would stabilize some activities, deliberately reduce others, and expand still others without relying on aggregate expansion. Confusing the two is like using a gasoline shortage in a car-dependent city as proof that a transit-oriented city cannot work.

Organized stability deserves the name only if core outcomes do not deteriorate simply because GDP stops rising: employment or access to income, balance-sheet solvency, financing of essential services, maintenance and transition investment, and human capabilities. Flat GDP accompanied by exploding unemployment and debt is not a post-growth success.

That gives the project a real burden of proof. It has to show how those functions can be maintained, not merely rename recession.

The objection therefore forces us to abandon the strongest version of the claim: "the economy cannot function without growth." The evidence supports something narrower. Under many contemporary institutions, unprepared stagnation puts several vital functions under pressure at the same time. A post-growth transition has to redesign those functions rather than simply hope GDP stops rising without consequence.

A second objection is equally important: the ecological transition itself requires expansion in some places—electric grids, building retrofits, public transportation, low-carbon equipment, health capacity, and perhaps particular industries. That rules out degrowth understood as uniform contraction. The goal cannot be a negative GDP number. It has to be a change in the material and institutional composition of the economy.

8. Replace the Functions, Not the Number

Once growth is understood as performing several functions, the policy problem becomes function-by-function replacement.

For employment, one route is to divide productivity gains between output and time instead of allowing volume to absorb most of the gain by default.

That immediately raises questions about hourly pay, household income, recruitment, and sectoral differences.

The distributional tension is unavoidable. A 20% reduction in hours is inaccessible to many households if it also means 20% less pay. Protect monthly income completely and hourly labor costs rise unless productivity rises enough to cover the difference. The issue is who receives the productivity gain and how labor-intensive sectors are financed.

The same logic applies to sectors that need to grow. Aggregate post-growth can coexist with more workers in care, renovation, energy systems, or transit while employment falls elsewhere. Work sharing is therefore partly about reallocation, not simply a uniform cut in hours.

That requires training, mobility, bargaining, and sometimes temporary support. "Employment" is not one homogeneous quantity; jobs differ by skill, place, working conditions, and social function.

Investment raises a parallel question: which capital should be renewed, transformed, or expanded? A stable economy still has to maintain networks, renovate buildings, build transition infrastructure, and finance research. Expansion investment has to be separated from maintenance and transformation.

Not all investment adds capacity. Replacing a boiler with a more efficient system can reduce energy use without increasing output. Replacing a road lane with transit infrastructure transforms capital. Replacing worn-out medical equipment maintains an existing service.

An economy that stops investing because aggregate GDP is stable simply runs down its capital stock. Post-growth therefore requires substantial gross investment: some to replace depreciation, some to transform infrastructure, and some to build capacities that are still missing.

The financing problem is subtler. Investors compare return, risk, and liquidity. Stable activities can attract capital if lower returns are compensated by lower risk or long time horizons. But a financial system that rewards capital appreciation above all else can penalize durability. Chapter 9 takes up that design problem.

Debt resilience can be improved through lower leverage, longer maturities, restructuring where necessary, and refinancing rules that do

not assume unrealistic future income. None of that requires abolishing credit.

For public services, the system has to accept that human-intensive activities may absorb a larger share of resources without being "productivity failures." The political question becomes which services are guaranteed and which durable tax bases finance them.

For firms, stable activity has to remain financially viable. Maintenance, repair, durability, and quality cannot be treated as failures merely because revenue or valuation is not rising rapidly.

Put together, the agenda is demanding. Employment dependence points toward shorter hours, work sharing, and income institutions. Weak private investment points toward distinguishing essential maintenance and transition investment from expansion. Fiscal dependence requires broader and more durable tax bases. Debt fragility requires attention to leverage, maturities, and restructuring. Rising relative costs in care and education require accepting that some valuable services should take a larger share of resources.

None of those responses is free. Shorter hours can reduce income. Wealth taxation can trigger avoidance and capital flight. Public investment can be badly chosen. Debt restructuring creates winners and losers. Labor-intensive services cost real labor and therefore require real social choices. Chapter 9 addresses those trade-offs in detail. Here we only need to establish that the trade-offs cannot be avoided by assuming broad expansion will continue indefinitely.

And one safeguard matters throughout: replacing one dependence with another is not a solution. A permanent service cannot safely depend on a tax base the transition is designed to eliminate. A permanent subsidy to socially useless production may preserve payrolls while failing to preserve useful work.

There will be no single post-growth instrument. The architecture has to be a package. The task here is narrower: identify the functions the package must replace.

9. Stability Without Permanent Expansion

Growth is often defended as though the alternative were scarcity. The real contrast is different. An economy can still possess knowledge, machines, homes, networks, hospitals, land, energy, and skilled workers even when the dollar value of total output is not rising every year. What makes stability difficult is not the sudden disappearance of those capacities. It is the web of commitments, distributions, and expectations built around their expansion.

We do not yet know how to build a large, stable post-growth economy. Degrowth has to prove that it can protect jobs or income without continually raising output; fund care and retirement without assuming ever-wider tax bases; maintain investment without requiring rising sales everywhere; manage debt without relying on asset appreciation; and let businesses endure without making expansion their condition of survival.

The tests have to remain local. If comparable economies can sustain employment and public revenue for long periods at zero growth under institutions close to ours, claims of dependence in those functions should weaken. If highly leveraged firms repeatedly pass through stagnation without cutting investment or employment, the debt mechanism should be reassessed.

The reverse is also true. Failure of one policy does not invalidate every part of the diagnosis. If shorter working time performs badly in one sector, that says nothing by itself about debt, tax revenue, or care costs. Evidence has to strike the mechanism it is supposed to refute.

That discipline keeps "growth dependence" from becoming unfalsifiable. Otherwise every crisis could be blamed on too little growth and every period of stability credited to past growth. Some functions may already be less dependent than the theory expects; the analysis has to allow that result.

We also need to separate dependence from preference. An institution may be able to operate without growth and still prefer growth because it makes choices easier. Another may publicly favor stability while remaining technically fragile when growth falls. The diagnosis concerns what the institution can withstand, not what it says it wants.

The conclusion is therefore narrower and more useful. If growth dependencies are institutional rather than natural, they can in principle be

redesigned. Because they are multiple, no single reform will do the job. The task is not to stop an economic machine. It is to rebuild several stabilizers that currently use growth as their common solution.

Chapter 2 showed that wanting more is not simply hardwired into human nature; status, insecurity, comparison, and infrastructure help shape it. This chapter adds the institutional half of the loop. Even when individuals are satisfied with less, employment, finance, public budgets, and debt can keep demanding expansion. Degrowth therefore cannot be a moral conversion of consumers or an instruction to firms. It has to change the architecture of economic stability.

Preferences are situated. Institutions are too. Neither desire nor dependence should be treated as natural or immutable.

Together, however, they are powerful. A society can produce people who find expansion desirable and institutions that find it necessary. Changing values alone may leave financial and employment pressures intact. Changing institutions alone may leave social norms pushing in the opposite direction.

That is why ecological transition cannot be merely moral or merely macroeconomic. It has to work on both levels and then test, in the material world, what the combined transformation actually achieves. The next part of the book turns to that test.

Methodological Notes and Status of the Evidence

Status of the Evidence

- A — documented observations — Employment and public revenues are cyclically sensitive; investment responds to expectations and financing conditions; debt service and refinancing can amplify shocks; labor-intensive services face persistent cost pressures.
- B — interpretation — Growth often operates as a cross-cutting stabilizer because several institutions lean on expansion at the same time.
- C — proposals — Shorter working time, tax reform, public investment, debt restructuring, and alternative business models are introduced here only as candidate responses. Their institutional design is developed later.

Failure criterion: if prolonged stagnation under institutions similar to ours could robustly preserve employment, investment, social-program revenue, and solvency in comparable economies, the claim of strong

institutional dependence would need revision. Conversely, the fact that recessions are painful does not prove that an intentionally designed post-growth economy would fail.

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PART II — PUTTING THE SYSTEM TO THE TEST

CHAPTER 4 — What Makes a Society Successful?

An economy can produce more while leaving people less secure. It can create jobs while housing moves out of reach. It can raise incomes while swallowing free time. It can expand market services while social isolation deepens. It can spend more on treatment while degrading the air, climate, and living conditions that shape health in the first place. Production matters. It just cannot tell us, by itself, whether a society is doing well.

The previous chapter showed why growth became such an effective institutional answer: it can support employment, investment, public revenue, debt service, and political compromise. That usefulness creates a trap. A variable that helps the system function can quietly become the definition of success itself.

So this chapter asks a basic question: what is an economy for? Without an answer, we cannot tell what should expand, what should shrink, or what should simply last. We also cannot tell whether lower output means real deprivation or the disappearance of activity that consumed resources without improving the things we actually value.

1. GDP Is a Tool, Not the Destination

GDP is powerful because it does a specific job reasonably well: it measures the market value of final production within an economy over a given period. It lets us track recessions, compare broad economic scale, study productivity, and relate output to fiscal measures. None of that requires pretending it measures human success.

The accounting clarity is useful. The mistake begins when a measure of production becomes a compressed theory of progress.

Every aggregate leaves things out. Unpaid domestic work is only partly visible. Replacing family care with a paid service can raise GDP even if the amount of care barely changes. Rebuilding after a disaster creates

economic activity without undoing the original loss. Spending on pollution cleanup, medical treatment, or security can be necessary and still reflect conditions nobody would choose to create.

These examples do not prove that GDP "counts badly." It answers its own question. They show that the question "how much monetary production took place?" is different from "what did we gain, net, in security, health, time, or capabilities?"

We must also understand why GDP occupies a place that a complex dashboard of well-being finds harder to obtain. It is frequent, relatively standardized, comparable, and has been used for decades in budgets, forecasts, and the media. An indicator available every quarter enters political language easily. A dimension measured irregularly or according to several conventions requires more interpretation.

This asymmetry of availability produces a bias in government without any particular intention being required. What can be summarized in one number enters more easily into a target, a headline, or a parliamentary debate. What requires ten indicators and a discussion of their tensions risks becoming an appendix.

The beyond-GDP agenda should therefore not be understood as the search for a new miraculous thermometer. Its purpose is to prevent a measure of production from being confused with the collective destination.

The problem appears when we ask it a different question: is this society doing better? GDP was not designed to answer that question on its own. It adds together very different monetary activities without knowing whether they correspond to an essential need, repair after damage, defensive expenditure, a luxury, or a lasting improvement. Nor does it tell us who receives the associated income, how much time was required to produce it, what unpaid work made it possible, or which resources were degraded in obtaining it.

A rise in GDP can correspond to a net improvement: more decent housing, care, reliable electricity, or education. It can also accompany mixed effects: more income but more commuting time; more production but rapidly rising housing costs; more health care because the population lives longer, or because it is sicker. The positive sign of the aggregate is not enough to distinguish between these stories.

How's Life? 2024 provides exactly this kind of dashboard. The OECD tracks more than eighty indicators covering material conditions, quality of life, inequalities, and resources for the future. Some income and employment indicators recently showed resilience or improvement while housing costs and reported financial well-being sent more worrying signals. Those indicators are not competing to reveal one hidden truth; they measure different functions.

This plurality forces us to abandon the reflex according to which a general economic improvement should automatically spread to every dimension. A society can become more productive while facing a housing crisis, or improve life expectancy while allowing social connection to deteriorate.

The distinction seems obvious once stated, but it has a profound political consequence. What we measure eventually organizes our attention. If a government's success is read mainly through growth in production, policies whose benefits appear as health, time, security, or social connection without generating much monetary activity risk being undervalued. Conversely, an activity that increases GDP may be praised even if its net benefit to collective life is ambiguous.

Stiglitz, Fitoussi, and Durand summarize this problem in the so-called "beyond GDP" agenda: GDP remains a powerful indicator, but it cannot bear the judgment on the health of a society by itself. The OECD now tracks dozens of indicators covering income, work, housing, health, safety, relationships, the environment, and life satisfaction. The important change is not merely technical. It is to recognize that production is one means among the conditions of life, not their accounting equivalent.

2. What Income Makes Possible

Any critique of productivism fails if it forgets why income matters. For someone struggling to pay rent, heat a home, eat well, or keep a work-dependent car running, additional income is not an abstract growth statistic. It can mean the difference between constant anxiety and a small margin of security. Where health, education, sanitation, or housing remain inadequate, more material provision can transform life.

Criticizing GDP does not make income irrelevant. The real question is what additional income makes possible in a given context. When resources

are scarce, it can open basic capabilities. After those needs are met, the same income may buy comfort, time, security, status, or experience. The human return to income changes with circumstance.

Income first matters because it loosens constraint. Paying the rent, replacing a broken appliance, affording transportation, or absorbing an emergency is not symbolic. Financial margin is itself a form of security.

But two households with the same annual income can possess very different freedoms. One owns its home without major debt, lives near work, and benefits from accessible public services. The other pays high rent, services a loan, must own two cars, and bears medical expenses. The same monetary income does not provide the same real room to maneuver.

Wealth changes the picture again. It does not necessarily provide current income, but it protects against certain shocks, opens access to credit, allows transfers across generations, and changes the cost of housing. A person with an average income and a fully paid home may be more secure than a person with a higher income but heavy debt.

There is also a difference between possessing a resource and being able to mobilize it. A high-value home can protect against rent without immediately providing liquidity. Liquid financial wealth can absorb a shock more easily. Two forms of wealth with the same accounting value therefore do not provide the same security.

Debt changes the picture again. A household can display substantial gross wealth and still be vulnerable to a rise in interest rates or a loss of employment. Conversely, a household with little private wealth may benefit from strong collective protection through unemployment insurance, health care, or social housing. Economic security is therefore a relationship between private resources and institutions.

This distinction explains why material well-being should not be summarized by disposable income alone. Chapter 6 will later analyze wealth concentration and power; here we need only see that the ability to withstand a shock also depends on stocks and obligations.

Current income, wealth, debt, local prices, and collective services have to remain distinct. Looking only at personal income can attribute to individuals what actually depends on the organization of prices and infrastructure.

This difference in function explains why the national average says so little about certain lives. Two societies of comparable wealth can achieve very different outcomes in housing, health, mobility, or economic security depending on their prices, public services, distribution, and infrastructure. Likewise, two people with the same nominal income can have very different real freedoms if one must pay for care, transport, or housing that the other receives collectively at low cost.

Housing is the most immediate example. In its international comparisons, the OECD notably uses a housing-cost overburden indicator when housing costs exceed 40% of disposable income. Low-income tenant households appear particularly exposed. This threshold is a comparative tool, not a universal boundary between affordable and unaffordable housing; above all, it shows why identical nominal income does not have the same value depending on the cost of access to a roof.

Cost overburden does not exhaust housing quality. A household may pay relatively little for housing that is poorly insulated, damp, overcrowded, or very far from services. Another may pay a great deal but enjoy strong security of tenure and exceptional access to work. Affordability, quality, location, and tenure security perform different functions.

Housing thus illustrates a general property of capabilities: they are often co-produced. Living adequately depends on the building, but also on energy, neighborhood, transport, safety, and legal stability. A policy that improves one element can be canceled out by deterioration in another.

This co-production makes comparisons difficult, but above all it prevents us from believing that an abstract increase in income automatically translates into a better life.

Territory works in the same way. A slightly lower salary in a region where housing and mobility are accessible can leave greater capability than a higher salary in a metropolis where rent absorbs the difference. Within a country, speaking of average living standards without prices or location can therefore conceal opposite experiences.

Disability, illness, or family responsibilities also change the conversion of income. Two people with the same resources do not need the same expenditures to achieve comparable autonomy. A compass of success must see these differences without trying to summarize them in a universal monetary value.

The human development approach has long emphasized the distinction between possessing resources and being able to lead a life one has reason to value. Economies provide means; the political question is what people can actually do and be with them. That protects degrowth from simply reversing the productivist error. The goal is not "less GDP" as a mirror image of "more GDP." The goal is to identify which resources are needed to make real possibilities widely accessible.

Human development offers a useful distinction here without requiring us to adopt any particular philosophical theory in full. Income is a means; health, education, and possibilities for choice are outcomes or conditions for action. The Human Development Index itself summarizes only three dimensions and does not claim to contain the whole of social life.

This limitation of the HDI is instructive. A concise index can correct a monetary obsession and facilitate comparisons, but it necessarily loses information. Two countries with similar scores can differ in freedom, security, relationships, distribution, or sustainability. The solution is not to keep adding components until we create a super-index; it is to know when aggregation stops helping.

3. What Market Accounts Miss

Much of what makes life good—or simply livable—does not map neatly onto market output. Health is an obvious case. Medical spending can rise because people receive better care, because the population is older, because treatment is expensive, or because people are sicker. Spending alone cannot tell those stories apart. Outcomes can: longevity, healthy life expectancy, access, prevention, mental health, and inequality.

Time creates the same problem. Economic accounts track wages and paid production far better than they track caring for children, helping relatives, cooking, cleaning, commuting, waiting, or simply having control over one's day. The need for separate time-use data makes the limitation visible: two economies can produce the same amount while distributing people's time very differently.

Time is uniquely nonrenewable at the individual level. An hour spent cannot be stored for next year. Yet market accounts value paid hours far more directly than time spent on care, household work, family, commuting, or leisure.

Time-use surveys make this dimension visible. The OECD database compares paid work, unpaid work, personal care, and leisure across around thirty countries, while warning that survey methods differ enough to make some level comparisons delicate. This caution is exemplary: measuring does not mean pretending to a precision that does not exist.

Two people with the same income can live radically different temporal lives. One works thirty-five hours and walks ten minutes to work; the other works forty-five hours and spends two hours a day commuting. Their income does not capture this time cost.

Free time itself must be distinguished from available time. A person may work fewer paid hours but take on more unpaid care. A collective reduction in paid working time can increase autonomy if unpaid work is shared; it can also shift the burden onto those who already carry it.

Control over one's schedule is another dimension. Two employees may work the same number of hours; the one who knows their schedule several weeks in advance has greater ability to organize childcare, relationships, or training than the one whose hours change at the last minute.

Commuting time must also be understood as a cost created by infrastructure. An hour lost each day to an obligatory journey does not appear directly as a cost in GDP; it may even support greater spending on fuel, vehicles, and services. From the standpoint of capability, however, it is a deduction from the day.

This observation gives us a reason not to oppose time and money naively. Higher income can buy services that free time; more time can make it possible to reduce certain expenses. The conversion between the two depends on the price of services, domestic sharing, and infrastructure.

Fragmented time matters as well. An hour of leisure interrupted, spent on call, or wedged between two journeys is not equivalent to an hour that is genuinely available. No statistical dashboard perfectly captures this quality, but ignoring the dimension makes it even less visible.

This point does not romanticize unpaid work. A significant share of domestic care is burdensome, invisible, and still distributed very unequally. Marketizing some tasks can free people from a real burden. But the reverse also exists: moving an activity from the home to the market can raise GDP without the amount of care or food produced increasing by

the same amount. What changes is the monetary boundary, not necessarily the human outcome.

Domestic work helps us understand why shifting activities into the market and improving well-being do not always move together. If a meal once prepared at home is purchased from a business, GDP rises; if the person begins preparing that meal themselves again, it may fall. The human question then depends on time, quality, enjoyment, constraint, and how the task is distributed.

Outsourcing an activity can be liberating when it reduces drudgery and creates a good-quality job. It can be costly when it results only from the lack of time produced by long working days. The chapter should not choose an ideal form of care; it should make visible what monetary flows alone cannot decide.

Autonomy is even harder to count. A person may have a decent income and little choice if their job is insecure, their territory requires two cars, their housing absorbs half their income, or they have no control over their schedule. Conversely, universal services, reliable transport, a library, a park, or an accessible health system can expand possibilities without appearing entirely as additional individual consumption. Economic freedom therefore cannot be reduced to the number of products available; it includes the concrete possibility of choosing one's path without every option requiring more market income.

Autonomy does not mean having every imaginable option. At a minimum, it means having real room to maneuver: being able to leave an abusive job without immediately losing one's home, access care, choose among several modes of transport, and have some time that is not constrained.

A society can therefore raise average income while reducing some room for autonomy if fixed costs rise faster or if services that were previously collective become conditional on a job or subscription. Conversely, a public service can increase autonomy without appearing as additional individual income.

We must also distinguish autonomy from the mere number of options. A supermarket offering fifty similar brands does not necessarily create more meaningful freedom than access to several modes of transport, stable

housing, or health care. Not all options carry the same weight in a life trajectory.

This distinction places another limit on using the market as an indicator of preference: a wide variety of products can coexist with a narrow variety of genuinely accessible living conditions.

This margin often depends on collective institutions. Public health insurance can increase a worker's autonomy by partially separating access to care from employment. A public transport network can increase the autonomy of someone who does not drive. Collective policy can therefore protect individual freedom without prescribing the precise use of that freedom.

Economic security is a related but distinct dimension. It refers to the ability to absorb a shock without collapse: a temporary loss of income, a breakdown, illness, separation. A society can have a high average income while imposing great vulnerability to shocks if households are heavily indebted or lack insurance.

4. Wealth Without Connection Is Not Enough

Some valuable things are not individual commodities at all. Trust, reliable relationships, usable public space, mutual support, and a sense of belonging emerge through institutions and repeated interaction. Money can help create the conditions for them, but they cannot be purchased the way we buy a phone.

Nor should social connection be romanticized. Families can support and dominate; communities can protect and exclude. More contact is not automatically better connection.

Loneliness, social isolation, available support, trust, and participation are different things. Someone can live alone without feeling lonely, while another person can be surrounded by people and still feel profoundly isolated.

The 2025 report of the WHO Commission on Social Connection estimates that around one person in six worldwide reports having experienced loneliness, according to the data synthesized by the Commission. This order of magnitude justifies treating social connection as a serious

collective outcome, without turning a subjective and heterogeneous measure into a uniform diagnosis.

The global figure should not be used to imply homogeneity. The WHO highlights variations by age, income, and region. The phenomenon is widespread enough to be collective, but its causes remain diverse: bereavement, illness, mobility, discrimination, work organization, urban planning, or technologies.

The link with health is also multifaceted. A social relationship can provide emotional support, information, material help, and a sense of belonging. Conversely, some relationships can be sources of stress. The reasonable public objective is therefore not to maximize the number of contacts, but to avoid organizing society in ways that systematically destroy the conditions for chosen relationships.

But a correlation between social connection and health does not yield an automatic policy. Relationships are mediated by time, housing, security, public spaces, school, work, and communication technologies. A government can improve or worsen these conditions; it cannot decree trust.

It would nevertheless be naive to conclude that the state should produce friendship. Relationships cannot be decreed. But policies shape their conditions: working time and schedules, transport, urban planning, safety in public spaces, the existence of libraries, cafés, associations, parks, neighborhood schools, digital access, and residential stability. Economic policy can therefore strongly influence sociability without that influence appearing in a simple monetary indicator.

This limit is politically important. As soon as a dimension is recognized as essential, the temptation arises to turn it into an administrable objective. Yet public policy can build a square, protect time, prevent eviction, or fund an association; it cannot guarantee that meaningful relationships will result.

The reasonable criterion therefore concerns the conditions that make relationships possible: does a society make relationships unnecessarily difficult through insecurity, travel, schedules, or the absence of common spaces? This question remains compatible with pluralism.

This dimension connects with what Chapter 2 showed about status and comparison. A society is not merely a collection of individuals consuming

resources. It is a web of relationships in which people recognize one another, cooperate, compete, protect one another, or become isolated. A definition of success that ignores this web can produce an abundance of goods and a poverty of relationships.

Relationships and status can even come into tension. A person may devote more hours to work in order to increase income and rank, while losing time with loved ones. This trade-off may be freely chosen, endured, or partly imposed by a professional environment. No single indicator can decide on their behalf, but a society can at least make the cost visible.

This visibility is one of the central functions of a multidimensional compass: to reveal that some forms of progress are paid for in another dimension instead of allowing monetary gain to automatically conceal the loss.

5. Averages Hide Who Is Losing

Even a good dashboard can mislead if it stops at averages. High life expectancy can hide enormous gaps by place, race, class, or income. Average income can rise while some households lose ground after housing costs. Average life satisfaction can remain stable while conditions deteriorate sharply for specific groups.

Averages summarize; they do not describe distribution. Ten people can each have 100, or nine can have 50 while one has 550. The average is identical. Security, opportunity, and economic power are not.

The same issue appears in health. If average life expectancy rises by two years but most of the gain accrues to already advantaged groups while another group exposed to pollution falls behind, the average improvement is real—but it describes a very different political reality from a broadly shared gain.

The same reasoning applies to time and housing. A national average of living space can increase while young households become more overcrowded. Average hours worked can fall while some occupations combine fragmented schedules and underemployment. The average is not false; it does not tell the distribution of capabilities.

This rule rules out an implicit compensation between people. A large improvement for those who are already better off should not

automatically erase a serious deprivation elsewhere simply because the average indicator improves.

The median corrects part of this problem, but it is not sufficient either. It can remain stable while the poorest fall behind or the richest pull away. Quantiles, deprivation thresholds, and territorial gaps answer different questions.

We must also distinguish the distribution of resources from the distribution of outcomes. Two groups can receive similar incomes and experience different life expectancies, commuting times, or housing conditions. Inequality is therefore not a single coefficient.

Chapter 6 will later examine who consumes, owns, decides, and bears the costs. Here, the principle is only methodological: no average outcome should be declared socially sufficient without looking at who is below it and why.

How's Life? 2024 emphasizes precisely this dimension. Despite a degree of average resilience in income and employment after recent crises, the OECD observes persistent pressures from housing costs and financial insecurity, as well as worrying signals in health, life satisfaction, and social connection. Several well-being gaps between groups remain deep. The methodological conclusion matters more than any individual figure: a national average is not enough to tell who benefits from progress and who bears its cost.

The OECD emphasizes that inequalities in well-being remain pronounced even when some average indicators improve. The framework explicitly examines gaps between groups, not only national levels. This architecture is more demanding than a single ranking, but more faithful to the political question.

Housing provides another concrete case: an average rise in income can be absorbed by rents that increase faster for some households. Income growth is not fictitious; its effect on the capability to secure housing depends on the market and on distribution.

This requirement changes the meaning of sufficiency. If we say that a society has "enough," we must always ask: enough for whom? A high average level of consumption can coexist with deprivation at the bottom and overconsumption at the top. A uniform reduction in flows could then

hit those who already lack enough. A degrowth policy therefore cannot simply aim at a lower average; it must be distributive by definition.

The chapter on inequality will return to this question in greater depth. For now, we need a measurement principle: every indicator of success must be accompanied by a reading of its distribution, thresholds, and the groups that remain exposed. A society is not successful because the average is doing well if some of its members do not have access to the minimum conditions that make choices real.

6. The Trap of One Better Number

Once GDP is judged insufficient, the obvious temptation is to build a better single number—one that blends income, health, education, environment, happiness, security, and relationships. The attraction is obvious: complexity disappears. So do some of the conflicts that matter.

Composite indicators can still be useful. The Human Development Index itself corrects an overly narrow focus on income. The problem is not aggregation as such; it is forgetting the judgments hidden inside it.

Every composite score makes choices about weighting and substitution. How much should health count relative to income? Can gains in one dimension offset losses in another? A formula can make those judgments explicit, bury them in a model, or hide them entirely. They remain judgments.

Weighting and compensation are not the same decision. Weighting asks how important each dimension is. Compensation asks whether improvement in one dimension is allowed to cancel deterioration in another.

A society may care deeply about both income and health while refusing to let a large income gain justify severe losses in physical safety. That is closer to a floor or a right than to a simple weight.

Aggregation across people raises an even harder question. Can a modest health gain for a thousand people offset a catastrophic loss for ten? Monetary valuation and quality-adjusted life measures can help with bounded decisions, but they should not quietly become a philosophy of human worth.

The safeguard is simple to state: make the weights visible, and identify the thresholds or rights that are not open to compensation.

A weighted average can produce results a society would reject if the trade-off were stated plainly. Higher average satisfaction should not automatically cancel the loss of a basic right; higher income should not automatically cancel a sharp increase in mortality.

Thresholds can represent that structure better. A minimum standard for housing, safety, or health access can be treated as a floor rather than a tradable component. But thresholds are still political and empirical choices. The index does not discover them for us.

Every aggregate answers hard questions whether it admits it or not: how much income is worth a year of healthy life? How much free time offsets more insecurity? How much reported satisfaction justifies environmental damage? Technical weights do not make those questions disappear.

Cost-benefit analysis remains useful for bounded decisions. Infrastructure, regulations, and public programs often require some form of comparison across effects. The rule is not "never translate values into a common unit." It is "never hide what that translation assumes."

A narrow policy question may justify a score. A society's overall success is better treated as a dashboard. The legitimacy of aggregation changes with the scale of the decision.

Numbers are not the problem. The problem is collapsing heterogeneous values into one unit and then forgetting the normative choice that made the conversion possible.

A good dashboard preserves disagreement instead of erasing it. It can show income improving while housing worsens, health improving while emissions rise, or free time expanding while job security deteriorates. That is less tidy than a single score—and more informative.

Dashboards have their own failure mode: they can become so crowded that anyone can cherry-pick the indicators that support a preferred conclusion. Pluralism therefore needs structure: a stable set of dimensions, transparent sub-indicators, explicit thresholds, and the ability to examine outcomes by group.

Indicators should answer questions, not merely fill a table. Housing measures should tell us whether people can secure adequate housing; health

measures whether people live longer and healthier lives; time measures how much control people have over their own days.

That functional link also makes revision easier. If an indicator stops measuring the thing we care about, we can replace it. A single master index can look continuous while its meaning shifts quietly underneath.

The goal is to avoid two opposite failures: one sovereign number that destroys information and an endless catalog that makes judgment impossible.

The OECD's How's Life? framework is useful here as an example, not a universal standard. It shows that an institution can track material conditions, quality of life, inequality, and future resources at once without pretending that an algorithm has solved the tensions among them.

The broader rule is the same one used throughout this book: do not force unlike values into artificial comparability. Keep thresholds, distributions, trends, and conflicts visible.

Rejecting one master score does not mean refusing to decide. It means naming the trade-off. If a policy improves employment while worsening air quality, the case for it has to explain why that trade-off is acceptable, for how long, and under what conditions.

That visibility matters especially in a society trying to reduce material throughput. Lower output can be desirable if the human capability is preserved; higher output can be justified when it relieves deprivation. A dashboard helps prevent GDP's direction from being mistaken for the direction of progress.

7. A Compass, Not a Blueprint for the Good Life

One philosophical objection remains: who decides what counts as a successful life? A list of health, autonomy, relationships, and time can become paternalistic very quickly. People may choose long hours, solitude, higher spending, or sacrifices that outsiders would reject. Chapter 2 already established that socially shaped preferences are not therefore false.

The richer the compass becomes, the sharper the problem. Health, safety, and housing command broad agreement. Other dimensions are more contested. Some people value work over leisure, mobility over rootedness, independence over communal life—or the reverse.

Pluralism does not mean every outcome is equally acceptable. A society can protect people from violence, hunger, or severe pollution without prescribing an ideal lifestyle. The challenge is to distinguish conditions that make many ways of life possible from choices that properly belong to individuals.

Some capabilities come first in practice because losing them makes many others impossible. Without basic physical safety, housing, or access to care, the freedom to pursue culture, education, or relationships becomes far less real.

That supports social floors without implying that a good life ends at the floor. Above a foundation of capabilities, lives can diverge radically.

The capabilities approach is useful for exactly this reason. Protecting mobility does not require everyone to travel. Protecting education does not assign anyone a career. Protecting time does not dictate how that time should be used.

A collective compass should expand the range of lives people can actually lead, not prescribe one approved life. UNDP's human-development framework captures this in terms of capabilities, choice, and substantive freedom.

The compass also needs a correction rule. If a policy meant to protect one capability persistently destroys another of comparable importance without demonstrable benefit, the policy should change.

Pluralism limits power; it does not eliminate standards.

Politics still involves constraint. Clean air rules restrict some activities. Health systems require taxes or contributions. Labor law can protect rest time. Transit investment redistributes public space and budgets. Those interventions are easier to justify when they protect common conditions of freedom rather than rank private tastes.

Capabilities can also collide. Noise limits protect sleep while restricting some nighttime activity. Habitat protection can restrict development rights. Health care requires revenue. A compass does not eliminate conflict; it keeps one indicator from settling the conflict by itself.

A successful society will not make every indicator rise at once. It will recognize losses, protect essential floors, and make its trade-offs visible.

For the rest of this book, that is enough of a working definition: success means broadly securing basic material conditions, improving health and safety, preserving time and agency, supporting relationships and participation, reducing avoidable deprivation, and maintaining the resources future generations will need. This is not a formula. It is a set of ends that have to be held together.

8. What Growth Has to Deliver

Once success is separated from growth, the burden of proof changes. More output is no longer presumed beneficial simply because GDP rises. What matters is what the activity actually delivers: health, security, time, capability, connection, resilience, or some other defensible human benefit.

A new home in a city with a housing shortage can expand an important capability. Replacing equipment that still works may raise production while adding almost nothing people actually need. The same movement in GDP can describe opposite social results.

The burden should remain proportionate. Nobody needs a philosophical hearing for every bakery or ordinary service. The stronger test belongs to major collective choices, high-impact sectors, and policies that justify expansion in the name of the public good.

At that scale, the question is straightforward even when the answer is not: what additional capability are we getting, for whom, at what material cost, and is there a less costly way to provide the same function?

That question connects human ends to physical throughput without collapsing one into the other.

The same symmetry applies to contraction. Closing a polluting activity may lower local GDP and improve health. If it also destroys essential incomes with no alternative, the result is still incomplete. Degrowth earns no moral credit from contraction alone.

This chapter is not building an anti-growth metric. It is removing growth's automatic privilege as the sign of progress.

Low material intensity is not automatically good either. A digital platform can use little material per transaction while degrading attention, labor conditions, or privacy. Heavy industry can be essential to an

electrical-grid rebuild. The question is what an activity does and what it costs—not which moral label attaches to its sector.

The inverse matters just as much. Water systems and decent housing are materially intensive and can be indispensable. Digital services can be light in material terms and harmful in other ways. Human function and material pressure have to remain separate tests.

From here on, every major activity faces two questions: what does it contribute to human capabilities, and what physical pressures does it require? A defensible decision has to answer both.

We now have a clearer picture of what needs protection: enough material provision for a dignified life, health, safety, time, agency, relationships, knowledge, fair distribution, and the ability to preserve those conditions over time.

That changes the ecological question. It is no longer "how much GDP can we keep?" It is "which capabilities do we want to guarantee, and what physical flows are required to guarantee them?"

Some capabilities may improve while market output falls. Necessary production may rise while other flows shrink. Aggregate GDP becomes an outcome of that reorganization rather than its purpose.

The same framework also guards against blind degrowth. If material contraction destroys health, safety, or autonomy when another configuration could have preserved them, it fails by the book's own standard.

Well-being indicators cannot answer the next question on their own: how much matter, energy, land, water, infrastructure, and technology are required to produce these outcomes? Can production keep rising while physical pressures fall fast enough? How far can innovation, decoupling, efficiency, recycling, and substitution take us?

That is where the argument turns from social ends to physical constraints.

Methodological Notes and Limits of the Evidence

The evidence in this chapter is used to distinguish dimensions and mechanisms, not to rank whole societies on a single scale. Recent sources

matter only where they change the strength of a claim or show how production and human outcomes can diverge.

Evidence Status

- A — documented observations — multidimensional OECD frameworks; distributional differences; time-use measurement; social connection and loneliness; UNDP's capabilities-and-choice approach.
- B — interpretations — GDP often functions as a political proxy for success; a plural dashboard preserves trade-offs better than a single score.
- C — proposals — protect social floors and substantive freedoms; track distribution and sustainability; treat production as a means rather than an end.

Core Sources

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OECD, Households' economic well-being dashboard — real household income distinguished from GDP per capita.

CHAPTER 5 — Growth in a Material World: Limits, Decoupling, and Technology

The last chapter gave us a human compass. A successful economy should help people secure food, housing, care, mobility, knowledge, time, participation, and safety without shifting the costs onto other groups or future generations. What it did not tell us is how much matter and energy are required to do that.

That is where the growth debate becomes physical. Every economy moves materials through mines, factories, farms, buildings, vehicles, networks, and waste streams. Energy powers those transformations. Land is occupied, water is used, ecosystems are altered. GDP can rise while describing none of those flows directly, but no economy exists without them.

1. Put the Economy Back in the Physical World

The starting point is not the slogan that the planet is finite. Efficiency can improve dramatically. Scarce materials can sometimes be substituted. Some activities can generate far more value with little additional physical throughput. The empirical questions are harder and more useful: which flows are rising, which are falling, what damage they cause, and what substitutions actually work?

Thinking in terms of metabolism makes the structure clearer. Societies have physical stocks—buildings, roads, machines, vehicles, grids, appliances—and need continuous flows to build, maintain, power, repair, and replace them. Some of those flows become long-lived stock; others are quickly dissipated as emissions, heat, wear, or waste.

That distinction matters when we talk about a "service economy." A medical visit, online class, bank transaction, or cultural service may use little material at the point of sale, but it still rests on buildings, power systems, servers, devices, transportation, and industrial supply chains. Value can become less material-intensive faster than the infrastructure supporting it does.

We must also distinguish the construction of a useful stock from its accelerated renewal. Building housing where it is lacking necessarily

increases flows of cement, steel, glass, and wood. Prematurely replacing buildings or appliances that still function also mobilizes flows, but it does not create the same additional capability.

The service provided therefore becomes the most useful conceptual unit. We do not want metric tons of concrete for their own sake; we want housing, bridges, schools. We do not want kilowatt-hours for their own sake; we want heat, light, movement, information. The ecological question becomes: how many flows are necessary to maintain or improve these services?

This reformulation avoids two errors. A metric ton is not well-being, and an economic activity with little direct mass is not therefore immaterial in the physical sense.

Data from the United Nations Environment Programme show the scale of the change. The Global Resources Outlook 2024 estimates that global extraction of natural resources rose from around 30 billion metric tons in 1970 to 106 billion metric tons in 2020. Without major transformation, it could increase by a further 60% by 2060. Resource extraction and processing account for a major share of global emissions and are heavily implicated in biodiversity loss, pollution, land use, and water stress.

The International Resource Panel also updated its global material-flow database in 2026, covering more than two hundred countries and regions through 2024. The value of these data lies less in producing a fetishized number than in making several boundaries visible: domestic extraction, imports, exports, material consumption, and footprint.

The differences in consumption are considerable. The Global Resources Outlook emphasizes that, on average, a resident of a high-income country mobilizes several times more resources than a resident of a low-income country. This asymmetry prevents us from turning a global average into a uniform prescription: building more infrastructure may be indispensable in one region and superfluous elsewhere.

These figures do not mean that every metric ton extracted is equivalent. A metric ton of sand, a metric ton of copper, a metric ton of biomass, and a metric ton of coal have neither the same functions nor the same harms. Nor do they mean that all extraction should decline everywhere. Some countries still lack housing, water networks, sanitation, electricity, hospitals, and transport. Chapter 4 specifically prevents us from reducing

sustainability to an objective of physical minimization: matter must be judged according to the human services it provides and the harms it imposes.

Materials differ in abundance, toxicity, extraction energy, location, and use. Sand and gravel dominate some mass measures because infrastructure is heavy. Metals may represent fewer metric tons while concentrating mining impacts and strategic dependencies. Biomass may be renewable and still degrade soils, forests, or biodiversity if its extraction exceeds ecological renewal rates.

A methodological rule follows: a decline in total mass is not always proportional to a decline in impact, and vice versa. Replacing a large mass of a relatively ordinary material with a small mass of a toxic or rare material may improve one indicator while worsening another.

The chapter will therefore never try to convert all pressures into a single "ecological metric ton." As with well-being in Chapter 4, the heterogeneity of dimensions must remain visible.

The question therefore becomes more demanding: can we provide more essential services to those who lack them while sufficiently reducing flows and impacts where they are excessive? It is this question, not the fetishism of a single global tonnage, that gives material degrowth its meaning.

2. Carbon Is Only One Part of the Material Test

Climate change rightly dominates environmental policy because greenhouse gases accumulate globally and because the timing is urgent. But lower carbon emissions do not automatically mean lower pressure everywhere else. A low-carbon power system still needs metals, grids, concrete, and land. Electric cars eliminate tailpipe emissions but not steel, tires, roads, urban space, particulates, or congestion. A low-carbon food system can still damage soils or biodiversity.

Carbon is distinctive because emissions accumulate against a global budget. That makes reduction pathways easier to define than for many other pressures. It does not make carbon a substitute for the environment as a whole.

Transitions also trade pressures across time. Grid expansion or deep building retrofits may require substantial materials now in order to reduce

energy use and emissions for decades. A policy can be physically costly in the short run and still be environmentally worthwhile over its full life.

Good analysis therefore does not simply add impacts together. It asks whether a pressure is being displaced, reduced, temporarily increased in order to obtain a lasting reduction elsewhere, or simply ignored.

The International Resource Panel emphasizes precisely this plurality. The extraction and processing of biomass play a major role in land-related biodiversity loss and water stress. Fossil fuels, metals, and non-metallic minerals generate other pressures. Speaking only of carbon can therefore shift damage rather than reduce it.

The plurality of pressures also implies different scales. CO_2 acts globally regardless of its source. River pollution or habitat destruction can be extremely serious locally while remaining invisible in a global aggregate. A policy can therefore be satisfactory on a global indicator and unacceptable in a specific territory.

This difference in scale matters for transition minerals. An electric battery may reduce emissions over its full period of use and still be associated with local extraction impacts. A complete judgment must compare life cycles and alternatives, not isolate the visible damage of a single technology.

This distinction also protects against the opposite error: counting all resources as though they were identical limits. Sunlight and wind are not "exhaustible" like a copper deposit, but the devices that capture them use materials, land, and infrastructure. The environmental problem is not that all energy or matter disappears; it is that some withdrawals, transformations, and releases exceed the renewal, substitution, or absorption capacities of the systems on which we depend.

A serious policy has to track several variables at once: greenhouse-gas emissions, materials, land, water, biodiversity, pollution, waste, critical resources, and sometimes highly local impacts. No single indicator can combine them without normative choices—just as no well-being index honestly summarized the previous chapter.

This requirement does not mean that hundreds of variables must be monitored with equal intensity. Some pressures have more robust budgets or thresholds; others require local assessments. Governance must accept this asymmetry rather than manufacture artificial precision.

Carbon can thus be governed through global pathways, materials through footprints and flows, biodiversity through pressure and state indicators, water by basins and seasons. Sustainability is not a single curve.

3. Decoupling: Ask Which Kind, Where, and How Fast

The green-growth debate often collapses around one word: decoupling. Relative decoupling means environmental pressure grows more slowly than GDP. Absolute decoupling means GDP rises while the pressure itself falls. The distinction is basic but decisive. If GDP rises 3 percent while emissions rise 1 percent, the economy has become less carbon-intensive. It has not reduced emissions.

Decoupling claims need qualifiers. Is the decline relative or absolute? Territorial or consumption-based? Temporary or sustained? Limited to carbon or spread across several major pressures? National or global? Without those distinctions, two people can both be "right" while describing different phenomena.

Speed matters just as much. A 0.5 percent annual decline is absolute decoupling, but it is not enough if the relevant ecological target requires reductions several times faster.

Finally, the denominator must be specified. GDP can rise because physical volumes increase, because relative prices and quality change, because services expand, or because the sectoral composition shifts. Decoupling from GDP is therefore not directly decoupling from the number of objects.

Absolute decoupling is not a fiction. The Global Carbon Budget 2025 identifies 35 economies in which fossil CO_2 emissions declined in a statistically significant way while GDP increased over the decade 2015–2024. Together, they represented around 27% of global fossil emissions. The number of these economies nearly doubled compared with the previous decade. An honest critique of growth must integrate this fact: technology, climate policy, sectoral change, and efficiency can indeed locally break the link between GDP growth and fossil emissions.

The IPCC had already identified cases of absolute consumption-based decoupling: over the short window 2010–2015, 43 countries out of 166 combined economic growth with stabilization or decline in their

consumption-based CO_2 emissions. This result destroys the idea that trade outsourcing necessarily explains every national case.

Consumption accounting is designed precisely to correct part of the effect of trade. Territorial emissions assign to a country what is emitted on its soil; a consumption footprint assigns emissions embodied in the goods consumed, whether they were produced domestically or imported.

High-income countries are often net importers of embodied emissions while several producing economies are net exporters. The IPCC highlights this shift linked to international trade. But the very existence of countries that have reduced consumption emissions shows that every improvement cannot be explained by simple relocation.

Footprint accounting nevertheless has its own uncertainties: complex supply chains, input-output matrices, reference years, and sectoral intensities. The right rule is to use it as a necessary correction, not as a perfect number.

The Global Carbon Budget 2025 reinforces this conclusion over a longer window for territorial fossil emissions: 35 economies experienced a statistically significant decline in fossil emissions over 2015–2024 while increasing their GDP.

These cases are empirically important. They show that climate policies, power-sector decarbonization, efficiency, changes in economic structure, and technologies can break the historical link between monetary activity and fossil emissions in some economies.

But they do not yet tell us whether the rates achieved are compatible with each climate budget, whether material footprints are declining, or whether the experience can be generalized to the entire world.

But the same report provides the other half of the picture. Global fossil emissions in 2025 are estimated at around 38.1 billion metric tons of CO_2, a new record. The reductions in economies that are decoupling have not yet offset rising energy demand and emissions elsewhere. The carbon intensity of energy is falling, but not fast enough to reduce the global total.

The contrast is precisely what makes the debate interesting. Economies can decouple locally while the global total continues to rise. This can happen because other regions grow faster, because technology diffusion is

uneven, because some sectors remain fossil-based, or because initial emission levels make the reductions insufficient.

In 2025, the Global Carbon Budget still estimates an increase in global fossil emissions. The existence of decoupling has therefore not yet produced the expected global outcome.

The relevant criterion is not the existence of an exemplary country but the possibility of extending the mechanisms quickly enough without shifting a significant share of pressures onto other regions.

Another difficulty comes from the composition of trade. Importing solar panels or turbines shifts part of the manufacturing emissions but may then reduce use-phase emissions for decades. Not all carbon-intensive imports are therefore externalizations in a moral sense.

The test concerns the life-cycle balance and the persistence of the transfer. An economy that closes its blast furnaces while importing the same quantity of steel has not truly reduced the associated material demand. An economy that temporarily imports equipment enabling a lasting reduction in fossil-fuel use tells a different story.

This distinction prevents the consumption footprint from becoming an automatic accusation. It serves to identify where pressure is actually generated in order to satisfy which use.

This is where we must abandon a false choice. Saying "decoupling exists" does not prove that green growth will suffice. Saying "global emissions are still increasing" does not prove that decoupling is impossible. Three additional questions are necessary: the magnitude of the reduction, its duration, and its generalization. A 1% annual decline in a pressure while GDP grows may be absolute decoupling and still be entirely insufficient for a given ecological budget.

The test can be formalized. First: is the pressure declining in absolute terms? Second: does that decline include the relevant imports and externalities? Third: does it last long enough to be distinguished from a crisis or fluctuation? Fourth: does its speed match the ecological constraint? Fifth: are other major pressures also declining?

A green-growth policy that satisfies only the first test for territorial CO_2 has achieved something real, but not the whole demonstration.

Conversely, a degrowth strategy that reduces GDP without satisfying these tests has demonstrated nothing either. A recession that temporarily lowers energy use while destroying transition investment is not a model of sustainability.

The same caution applies to materials. The systematic review by Haberl and colleagues, covering 835 articles, finds cases of decoupling but concludes that the observed rates do not, by themselves, deliver the rapid and large reductions in resources and emissions required by ambitious environmental goals. A study published in 2025 on the material footprints of the European Union, the United States, and the BRICS likewise shows heterogeneous situations: episodes of strong decoupling exist, but they vary across regions and periods.

The material difficulty is more severe because matter often enters long-lived stocks. A city under construction can rapidly increase its material footprint while creating housing, railways, and networks used for fifty years. A society that is already equipped can maintain the same services with more repair and less new construction.

This difference in development phase makes international comparisons delicate. A poor country building its first sanitation network is not in the same situation as a rich country prematurely replacing equipment.

Stocks also explain why flows cannot be interpreted without their history. A rich society has already incorporated immense quantities of cement, steel, copper, and glass into its cities, roads, and networks. A society undergoing urbanization still has to build part of this capital. Asking the two to have the same annual flow would ignore the accumulated material inheritance.

Conversely, a large stock creates maintenance needs. Buildings must be renovated, bridges inspected, networks replaced. A mature economy therefore never becomes immaterial; it can, however, shift part of its flows from expansion toward maintenance.

This avoids a false statistical success. Deferring maintenance can temporarily reduce material use while quietly accumulating a physical debt that will demand more resources later. Lower flows are durable only if the useful stock remains functional.

The review by Haberl and colleagues should therefore be read as an assessment of observations, not as a theorem about the future. It shows

that sufficiently rapid and global absolute decoupling has been rare in historical data; it does not prove that a new combination of policies and technologies could not change that result.

The useful debate is therefore no longer: "decoupling, true or false?" It is: "for which pressures, in which territories, under production or consumption accounting, for how long, and at what speed relative to the constraints that must be respected?" This formulation is less spectacular, but it is testable.

The most demanding formulation becomes: how much human benefit can be separated from which physical pressure, at what speed, across which accounting boundary, and with what consequences elsewhere? This question is empirical and revisable.

It also makes it possible to specify what would refute part of the degrowth thesis. If rich economies were durably able to increase human capabilities and monetary activity while reducing their carbon, material, and other major footprints fast enough along trajectories compatible with ecological constraints, the argument for macroeconomic contraction would lose a significant part of its necessity.

4. Efficiency Helps—But It Can Also Change Demand

Efficiency is one of the main engines of decoupling. Heat pumps can deliver more useful heat per unit of energy than resistance heating. Electric motors convert more input energy into motion than combustion engines. Insulation lowers energy needs for the same indoor comfort. Industry can use less material per unit of output. These gains are real and essential.

Efficiency can mean less energy per mile, less material per unit, better use of buildings, longer product life, heat recovery, or better logistics. The first-order gains are physical.

The complication is behavioral and systemic. When a service becomes cheaper, people may use more of it. Firms may reinvest the savings. Economy-wide productivity gains can lower prices and expand markets. Efficiency can reduce pressure per unit while total pressure falls by less—or even rises.

Direct rebound concerns greater use of the same service. Indirect rebound concerns reallocating income or savings toward other consumption. Macroeconomic rebound includes changes in prices, investment, production structure, and growth at the scale of the system.

But these gains have an important economic property: making a service less costly can increase its use. A more efficient car costs less to operate and may encourage more kilometers; material savings can lower a product's price and facilitate market expansion; the money saved can be spent elsewhere. This recovery of part of the expected savings is called rebound.

A simple example helps. If a car uses 20% less fuel per kilometer but its driver travels 10% more kilometers because the cost of use falls, part of the gain is taken back. A net saving nevertheless remains. If use rises by more than 25%, the initial gain can be completely canceled out.

This arithmetic does not provide a general rebound rate. The response depends on the price of the service, income, available time, infrastructure, and preferences. In some saturated uses, direct rebound is small; in others, it can be substantial.

Reviews of the literature confirm this heterogeneity. Macroeconomic effects are even harder to estimate because they depend on many feedback loops. It would therefore be just as misleading to say "efficiency is useless" as to write the entire technical gain into a scenario as though it automatically became an absolute reduction.

At the scale of a household or appliance, rebound can be limited. At the scale of the economy, it includes more mechanisms: changes in prices, investment, new uses, growth in sectors made more profitable, and reallocation of income. The review by Brockway and colleagues concludes that estimates are methodologically diverse, but that many studies suggest substantial macroeconomic rebound effects, potentially erasing more than half of the energy savings initially anticipated.

Policy can reduce rebound without eliminating efficiency. Absolute standards, pricing, sectoral caps, taxes, or different infrastructure can prevent a decline in unit cost from being converted entirely into additional volume.

This combination is conceptually important: efficiency and sufficiency are not rival strategies. Efficiency reduces the amount required per service;

sufficiency limits the quantity of services or equipment where their multiplication produces little additional capability.

The outcome therefore depends on the social use of the efficiency dividend.

We can distinguish three main destinations for this dividend. It can become a lower bill or lower resource use for the same service. It can be converted into more of the same service. Or it can be spent elsewhere. Policy influences the share going to each of these destinations.

A performance standard alone guarantees the unit gain but not the trajectory of total volume. A tax or cap can preserve part of the physical saving. Infrastructure that reduces the need for the service—urban proximity rather than automobile kilometers—works in yet another way.

Rebound thus becomes a question of institutional design rather than a psychological destiny. It explains why technical gains must be tracked in absolute consumption after diffusion, not merely announced from theoretical efficiency.

This result does not mean that efficiency is useless. If a heat pump requires three times less energy for the same service, the physical world has genuinely changed. It means that efficiency is not automatically a policy of absolute reduction. If the objective is an overall limit, we must also consider volumes, infrastructure, prices, and uses. An improvement per unit does not guarantee a decline in the total when the number of units increases enough.

This distinction is fundamental to the manifesto. Technology often makes it possible to do better with less. Sufficiency then asks how far we want to use the gain to produce more, and how far we want to convert it into reduced pressure, time, quality, or access for those who still lack the service.

5. Circularity Helps Only If Primary Throughput Actually Falls

Recycling and circular production are indispensable, but the slogan of a "closed loop" can hide what matters. Reuse, repair, remanufacturing, material recovery, and longer product lives can displace new extraction. They do not automatically do so if the total stock of buildings, vehicles, devices, and infrastructure keeps growing.

Circularity has to be measured in flows, not just in waste collected. A high recycling rate can coexist with rising use of virgin material when demand for total material grows faster than recycled material returns.

Suppose 80 units out of 100 leaving use are recovered, but annual material demand rises from 100 to 150. Even with excellent recycling, at least 70 new units still have to come from somewhere before accounting for processing losses or quality limits. Expanding stocks create continuing demand for primary material.

Conversely, in an economy where stocks are largely built and demand is stable, the same recovery efficiency can replace a much larger share of primary material. Circularity therefore becomes more powerful when total flows stop growing rapidly.

But a fully circular economy does not exist in the literal sense. Materials degrade, disperse, and mix; recovering them requires energy and equipment; some uses make recycling extremely difficult. Above all, an economy whose material stock continues to grow needs new inputs even with perfect recycling of the returning flow. If the number of buildings, vehicles, batteries, or machines increases, recycled materials from a smaller stock cannot immediately supply the larger stock.

Different materials face different constraints. Metals can be recycled many times if collection and separation are good. Plastics often suffer contamination and degradation. Burned fossil fuels are dissipated; coal is not recycled after combustion. Some phosphorus, nitrogen, or construction materials disperse.

European data illustrate this heterogeneity: in 2024, secondary materials accounted for around 12.2% of total material use in the European Union, with much higher circularity for metallic ores than for fossil materials. This figure measures a share reintroduced into the economy, not a world that is "12.2% circular" in the sense of global physical closure.

Three measures have to remain distinct: recycling rate, recycled content, and actual substitution for virgin material. A material can be technically recyclable without displacing primary extraction if total production keeps growing or if the recyclate ends up in a different use.

Circularity therefore works best with three strategies combined: slow replacement, design for repair and disassembly, then recycle what can no

longer be reused. It becomes much more powerful in a maintenance economy than in one where volumes and stocks are increasing rapidly.

The most demanding criterion is how much primary material is actually displaced. A metric ton of recyclate has a decisive effect on extraction only if it actually replaces a metric ton—or a measurable fraction—of primary material that would otherwise have been produced.

This substitution is particularly difficult when demand grows quickly. The waste available today comes from yesterday's sales; in an expanding market, it is necessarily insufficient to supply all the new volume. Recycling becomes more important as the first large stocks reach end of life, but it remains delayed in time.

The quality of sorting and design then determines what can return to the same function. Mixing alloys, gluing materials together, or dispersing small quantities can make recovery costly. Designing for disassembly and separation is therefore a material policy before it is a waste policy.

Chapter 8 will detail this hierarchy. Here, it is enough to remember that the recycling rate does not answer the main question: how much additional primary material was actually avoided?

IEA work on critical minerals shows both the power and the limits of recycling. In its Announced Pledges Scenario, successful expansion of recycling could reduce the need for new mine development by 2050 by 40% for copper and cobalt, and by 25% for lithium and nickel. That is considerable; it does not mean the disappearance of primary extraction or a uniform reduction in all mining activity.

This conclusion strengthens rather than weakens the case for circularity: a strategy that avoids a quarter or more of a future mining requirement is major precisely because we do not ask it to make physics disappear.

We must also distinguish circularity from substitution. Replacing cobalt with a different battery chemistry may reduce one dependency and increase another. Copper can sometimes be replaced by aluminum; some magnets can use fewer rare earths; recycling can increase. Technology therefore shifts constraints and creates new options. But no substitution removes the need to look at the whole system.

A technological substitution sometimes changes mass and impacts in opposite directions. Using more aluminum may reduce a copper

requirement but require greater volume; changing battery chemistry may reduce cobalt and increase other minerals. No material is "clean" by nature.

The right criterion is functional and systemic: is the service maintained with a lower total footprint and more manageable dependencies?

6. Take Technological Progress Seriously

Any critique of growth that dismissed technology as an illusion would fail immediately. Renewable-energy costs have fallen dramatically. Batteries have improved. Electric vehicles are far more energy-efficient in use than internal-combustion vehicles. Lighting uses far less energy per unit of illumination. Industrial processes are changing, and several power systems have genuinely decarbonized.

But invention is only the beginning. A technology must be manufactured, financed, permitted, connected, maintained, and adopted. Transition speed depends as much on deployment capacity and stock turnover as on laboratory performance.

Capital lasts. Buildings can stand for a century; cars for fifteen or twenty years; power networks for decades. Replacing equipment too early can raise manufacturing impacts, while waiting too long can lock in pollution. Better technology does not erase the timing problem.

This tension gives particular importance to moments of natural replacement. A standard applied as a stock is renewed can progressively transform the system with less destruction of capital. In urgent sectors, however, it may still be rational to accelerate replacement.

The IPCC emphasizes that it is technically possible to provide many well-being services with far less energy and fewer resources. Its work on demand-side options shows that nutrition, housing, mobility, comfort, and communication can be provided in very different ways depending on infrastructure, technologies, and social organization. This point connects directly to Chapter 4: what people need is not energy itself, but the services it provides.

Demand-side strategies matter because they reduce the amount of infrastructure that supply must decarbonize. A more compact city requires

fewer vehicle-kilometers; a passive building requires less winter electricity generation; a durable product slows manufacturing needs.

This logic is not hostile to technology. On the contrary, it increases its effect: every renewable kilowatt-hour replaces a larger share of the system when the demand to be met is lower.

This perspective reverses part of the debate. A dense and accessible city can provide more mobility with fewer automobile kilometers. A well-designed home provides comfort with less heating. A durable appliance provides the same service with less replacement. A video conference can sometimes replace an air journey. Technology and organization can therefore sharply reduce the material intensity of human ends.

But the technological transition is itself material. Electricity grids, batteries, transformers, wind turbines, photovoltaic panels, public transport, and renovations use metals, concrete, glass, machines, and labor. The International Energy Agency's outlooks still indicate in 2026 strong growth in demand for critical minerals linked to electrification. Some supply chains remain geographically concentrated, and copper remains particularly sensitive to lead times, ore quality, and grid expansion.

The 2026 edition of the IEA Global Critical Minerals Outlook notes that the supply chains for many energy minerals remain concentrated. The availability of a solar panel or battery in a catalog therefore does not guarantee that hundreds of millions of units can be produced at the desired pace without new mines, refineries, power lines, and industrial skills.

Geographical concentration sometimes concerns refining more than extraction. An ore may be mined in several countries but processed mainly in one. Resilience therefore depends on the entire chain: mining, processing, components, manufacturing, transport, and recycling.

This architecture creates irreducible delays. A new mine can require many years between discovery, authorization, and production. A refining plant, a grid, or a transmission line requires capital, skilled labor, and planning. Innovation can reduce the amount required per unit, but it does not immediately remove these bottlenecks.

Material constraints cut both ways. They can accelerate substitution toward less resource-intensive technologies, or they can slow deployment.

Critical resources belong in scenario analysis, not in automatic claims that a technological ceiling has been reached.

Concentration is not proof of impossibility. It indicates a risk to speed and resilience. New mines can open, chemistries can change, recycling can increase, demand can be reduced, and supplies diversified. But each of these responses takes time.

The technological case has to be judged across the full deployment timeline: invention, scale-up, factory construction, material supply, stock turnover, and finally the measured decline in the pressure the technology was meant to reduce.

The correct conclusion is therefore neither "technology will save us" nor "technology is useless." It is more precise: technology can profoundly shift the boundary between services provided and resources used, but it must itself be evaluated through its flows, infrastructure, deployment, rebound effects, and distribution. It expands the space of possibilities; it does not choose for us what quantity is sufficient.

A successful technology can profoundly shift the frontier of what is possible. Photovoltaic panels and batteries show that cost curves can evolve faster than expected. The manifesto must remain open to breakthroughs of the same kind.

But a scenario must not credit in advance an undeployed breakthrough as though it had already delivered its reductions. Innovation is a possibility whose value is measured when it becomes real substitution.

7. The Hardest Objection: What If Green Growth Works?

The strongest challenge to the degrowth thesis is not theoretical. It is empirical: what if the ongoing transition succeeds? Suppose electricity keeps decarbonizing, efficiency keeps improving, vehicles electrify, industry innovates, recycling expands, and high-income economies continue shifting toward services while reducing major environmental pressures. Why decide in advance that growth itself has to end?

GDP is not a physical quantity. An economy can generate more value from software, medicine, research, culture, care, quality, or longer-lived products while using fewer materials and producing fewer emissions. Nothing in national accounting rules that out.

The strongest version goes further: a mature economy could keep raising monetary value mainly through quality, services, knowledge, and better use of existing stocks while total material throughput stabilizes or falls. That trajectory is logically possible.

This chapter does not rule it out. The question is whether such a pattern can become broad, fast, and durable enough in the real world—not whether it can be described in an accounting model.

That means looking at both footprints and outcomes. Higher value added from better care can expand human capability. Higher rents can raise measured output without doing the same thing. GDP does not distinguish those cases by itself; the human compass from Chapter 4 does.

If green growth can reduce the major physical pressures fast enough while preserving or improving human capabilities, then forcing GDP downward would be pointless and could even make investment, employment, or innovation harder. That possibility directly limits the scope of the degrowth claim.

It also rules out several easy arguments. GDP and emissions are not inseparable. Not every form of growth increases every material flow. Modern technologies do sometimes solve environmental problems rather than merely move them around.

Services are not just accounting camouflage either. Some genuinely create high value with relatively little additional material use. Economic composition can therefore contribute to decoupling.

But the ecological test is not whether value becomes more intangible. It is whether the relevant absolute pressures actually fall.

What remains is a narrower claim. First, global fossil emissions and material extraction remain high. Second, success on carbon does not guarantee success on materials, land, biodiversity, water, or pollution. Third, timing matters: absolute decoupling that is too slow can still overshoot ecological limits. Fourth, the transition itself requires industrial capacity and material inputs that have to be prioritized.

Those claims have to be tested at four different levels: physical feasibility, technological feasibility, economic feasibility, and historical-political feasibility. A possibility in one domain does not prove success in the others.

Physical possibility does not guarantee historical speed. Historical underperformance does not prove permanent impossibility. That is why this chapter refuses absolute verdicts.

The key issue is risk. The faster the required reductions and the greater the technological uncertainty, the less prudent it is to rely entirely on efficiency improvements outrunning continued growth in total volumes.

Degrowth is therefore not established by proving decoupling impossible. That impossibility has not been established. Its stronger case is risk reduction: in high-consumption economies, lowering unnecessary material demand reduces how much future technological improvement must accomplish.

That means combining lower demand where flows are already excessive with efficiency, decarbonization, substitution, and innovation. The purpose is not to replace technology, but to reduce the size of the technological bet.

This is a more modest claim than announcing a new economic law. If a rich society can provide the same housing, mobility, or health with fewer vehicles, fewer replacement cycles, or less travel, it does not have to wait for every additional unit of consumption to become perfectly clean.

The distinction matters because it makes the argument falsifiable. "Green growth is impossible" can be overturned by durable counterexamples. "Green growth has to deliver sufficiently fast absolute reductions across the major pressures" defines an ongoing empirical test.

A strong green-growth path would have to show, over long periods, rising human capabilities and GDP alongside sufficiently rapid absolute declines in carbon footprints, material footprints, and other major pressures, without simply shifting impacts abroad.

And it has to be compared with plausible alternatives, not with an imaginary perfect world. If two strategies cut emissions equally but one requires far more material throughput for similar human outcomes, the lower-throughput path carries less physical risk. If the more technology-intensive path delivers better outcomes with a lower total footprint, it should win.

The word degrowth gets no moral priority here. The priority belongs to reducing excessive pressures while preserving as much human capability as possible.

Green growth passes the test when it does that without requiring macroeconomic contraction. Degrowth becomes useful when lowering demand reduces the scale of material flows that would otherwise have to be decarbonized, substituted, or recycled—without turning that reduction into deprivation.

If broad green growth becomes durable across high-income economies and remains compatible with climate and ecological constraints, the argument for macroeconomic contraction has to be revised. This book is not entitled to protect itself from that result.

8. What This Chapter Shows—and What It Does Not

The material world constrains the economy. That statement is obvious. What matters is what follows from it. It does not tell us the right level of GDP. It does not make all extraction wrong. It does not tell lower-income countries to stop building needed infrastructure. It does not show that innovation cannot expand what is materially possible. It does not even establish that long-run growth decoupled from all major environmental pressures is impossible in principle.

So the first conclusion is negative: there is no simple identity between GDP growth and ecological destruction. The second is positive: neither slower GDP growth nor lower environmental intensity is enough to demonstrate sustainability.

The test is always the relevant absolute pressure together with the human capability preserved. A policy cannot point to one improving indicator while ignoring another that deteriorates. Every claim has to be checked against its boundaries, time horizon, distribution, and real-world outcomes.

That produces four distinct cases. Growth with rising pressures is ecological failure. Growth with sufficiently rapid falling pressures is a possible green-growth success. Contraction with rising pressures fails on both dimensions. Contraction with falling pressures still has to be judged by human outcomes and distribution.

The sign of GDP never settles the question. At minimum, we need two axes: human capability and physical pressure.

What the evidence does show is that major physical pressures remain high and several are still increasing. Absolute decoupling exists in some places and for some pressures, but its significance depends on speed, duration, geographic boundaries, and whether other pressures are falling too.

Efficiency and circularity are necessary but can be partly offset by growth in total volumes. Low-carbon technologies reduce some harms while requiring substantial new infrastructure and material reorganization. GDP growth cannot therefore be treated as environmentally neutral by default.

Measurement boundaries matter. Territorial emissions can fall while imported footprints remain high. Recycling rates can rise while virgin-material use also rises. Unit efficiency can improve while total volume expands. Those apparent contradictions disappear only when the underlying physical function is measured correctly.

Time is itself a physical constraint. A technology that arrives thirty years too late can be excellent and still be insufficient.

Chapter 4 gave us a rule: protect the ends and test the means. This chapter adds another: when several means can provide the same service, prefer the ones that use fewer resources and cause less damage—especially where essential needs are already met.

That is not yet a full degrowth policy. It is a material selection rule.

Nor does it make material use inherently bad. Some flows need to rise: housing, water systems, sanitation, energy infrastructure, and other basic stocks where capabilities are still missing. Justice cannot be derived from one global ceiling applied uniformly.

The next chapter therefore adds distribution to the physical analysis: who uses resources, who receives the capabilities they produce, who owns the assets, who decides the flows, and who bears the damage?

That question cannot be postponed. Global totals combine subsistence and luxury consumption, new infrastructure and rapid replacement, populations with low historical responsibility and others whose material stocks are already enormous.

Reducing total pressure may therefore require opposite movements across sectors and places. Chapter 6 makes that asymmetry politically explicit.

Even if we know some flows must fall, the distributional question remains: who should reduce what? Global averages hide enormous differences in resource use and capability deprivation. Uniform contraction would be as crude as uniform growth.

The argument has now become stricter in both directions. Growth is no longer the default measure of success, but degrowth is not allowed to become its mirror-image goal. The measurable requirement is narrower: reduce excessive pressures fast enough while preserving or expanding human capabilities.

Methodological Notes and Reconstruction Traceability

This chapter is a controlled reconstruction of the project's earlier material analysis. The preserved functions are explicit: physical flows; carbon and other pressures; relative and absolute decoupling; efficiency and rebound; circularity; technology; the strongest green-growth objection; and the limits of the conclusion. Exact textual identity with the former draft cannot be certified.

Documentary update as of August 13, 2026: the Global Carbon Budget 2025 remains the annual consolidated reference for fossil-fuel emissions; the International Resource Panel updated its global material-flow database in 2026; and the IEA published the Global Critical Minerals Outlook 2026. These updates strengthen the evidence base without changing the chapter's core claim.

Core Sources

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CHAPTER 6 — Who Pays? Inequality, Power, and Responsibility

The previous chapter put physical pressure back into the picture. But a new abstraction appears the moment we start talking about "our emissions," "our footprint," or "our consumption" as though humanity were one average consumer facing one ecological bill.

There is no such consumer. Some people fly constantly; others have never boarded a plane. Some own multiple homes; others struggle to heat one. Some control large portfolios of productive assets; others own almost nothing. Some countries built wealth through two centuries of fossil-fuel use, while others still lack hospitals, water systems, safe housing, and basic transportation.

A degrowth politics that ignores those differences would repeat the mistake it criticizes in growth economics: treating an average as though it described real lives. The distributional questions are unavoidable. Who has to reduce what? Who still needs more access to essentials? Who can actually change infrastructure? Who owns the assets? Who absorbs the losses?

1. The Average Hides the Distribution

Global emissions are highly concentrated, but the exact shares depend on the accounting method and year. The IPCC places the highest-emitting 10 percent of households at roughly one-third to nearly one-half of consumption-based household emissions, while the bottom half contributes a far smaller share. The range matters; the concentration does too.

Income is a strong predictor because it expands access to larger homes, more mobility, more goods, long-distance travel, and faster replacement cycles. It is not destiny. Households with similar incomes can have very different footprints because of housing, climate, family size, location, wealth, infrastructure, and preferences.

That distinction prevents a statistical pattern from turning into a moral verdict on every individual. It still tells us where the largest reduction

potential is concentrated: very high-footprint consumption appears disproportionately near the top.

We must also distinguish income from wealth. Income makes current consumption possible; wealth cushions shocks, provides access to credit, makes it possible to own multiple homes or other assets, and sometimes confers influence over economic decisions. A transition policy therefore cannot assume that two households with the same income have the same capacity to adjust.

A heavily indebted person with a high income may have little immediate flexibility; someone with a more modest income but substantial wealth may find it easier to absorb the cost of a renovation. Capacity to act is a separate dimension from the current footprint.

The same asymmetry appears when we look at materials rather than carbon alone. High-consuming households mobilize more metals, fuels, biomass, and construction materials. This concentration is particularly significant for discretionary consumption: frequent air travel, very large homes, heavy vehicles, rapid replacement of equipment, long-distance travel, and luxury goods.

The Global Resources Outlook 2024 provides a particularly useful order of magnitude: high-income countries use, on average, about six times more resources per person than low-income countries and generate about ten times the associated climate impacts. This difference does not mean that every rich person consumes six times as much as every poor person; it situates the metabolic gap between types of economies.

High material consumption in rich countries partly corresponds to real services—housing, transportation, health care, digital services—but also to already abundant stocks, large spaces, rapid replacement cycles, and discretionary consumption. The distributive question is therefore not only who has more, but what share of that additional consumption is still necessary for human capabilities.

This point prepares a rule that will become central in Chapter 7: reduction should begin where use is high, substitutable, and adds little further capability—not where a resource still supports a basic need.

It would nevertheless be too easy to turn this observation into a moral formula: "the rich are the problem, the poor are innocent." Income does not explain everything. Two households with the same income may live in

a dense city or in an area without public transportation, occupy a well-insulated home or an energy-inefficient one, have access to rail service or depend on a car. The distribution of footprints is simultaneously a distribution of purchasing power and a distribution of infrastructure, constraints, and options.

The language of blame is particularly misleading because it mixes three levels. A person may have a high footprint; that describes an outcome. They may have many alternatives available; that describes a capacity to act. They may have helped preserve rules that favor that footprint; that describes additional power or causal responsibility. These three propositions are not equivalent.

A just transition can therefore ask more of someone without declaring that person morally at fault. The principle is comparable to progressive taxation: greater capacity to contribute can justify a greater effort independently of any judgment about virtue.

Conversely, a low footprint does not automatically grant immunity from every future decision. A lower-income household may support polluting infrastructure or want a form of consumption that would become problematic if generalized. Justice concerns situations and available choices, not fixed moral identities.

This distinction is decisive for policy. A metric ton of carbon saved by eliminating a regular leisure flight does not carry the same human cost as a metric ton saved by preventing an inadequately housed household from heating its home. The same reduction in kilowatt-hours may mean chosen restraint in a large home or deprivation under conditions of energy poverty. Arithmetically equal effort can therefore produce profound real inequality.

We can restate this with a simple test: what human service is lost through the reduction? Forgoing a weekend flight removes one particular leisure activity; reducing heat in a poorly insulated home can harm health. The two carbon savings are not socially equivalent even if they are equivalent in atmospheric accounting.

This difference does not mean that an essential need should remain carbon-intensive forever. It means that the means of meeting it should be transformed first: insulate the home, provide a heat pump, improve

transportation. A just policy seeks to reduce the footprint of a necessary service before reducing the service itself.

2. Consumption Is Only the First Layer

The first responsibility is easy to see: consumption. Buying a flight, heating a home, driving, or purchasing a product mobilizes energy and materials somewhere in the supply chain.

Consumption-based accounting follows final demand across borders. A laptop bought in the United States may embody mining, refining, component manufacturing, assembly, shipping, and electricity use across several countries. The purpose is not to assign all responsibility to the buyer, but to reveal pressures that territorial accounting leaves elsewhere.

That accounting answers a specific question: how much global pressure is associated with what residents of an economy ultimately consume, regardless of where production occurs?

It does not prove that the final consumer personally chose every technology used along the chain. The buyer chooses a product from among available offerings; they do not necessarily choose the factory's electricity mix, the ore used, the regulations of the producing country, or the mode of freight transport.

Assigning an emission to final demand is therefore a useful causal accounting convention, not a complete attribution of power. Political responsibility must also take into account the availability of alternatives and the decisions made by producers, investors, and governments.

This approach corrects a common illusion. A country can close a highly polluting factory, then import the same products and report a decline in its territorial emissions. Its statistical emissions profile has improved; its material demand has changed much less. Consumption-based accounts therefore reveal what the national boundary hides.

The mechanism of outsourcing can be made concrete. If a country closes a steel mill and imports exactly the same amount of steel from a more carbon-intensive country, its territorial emissions decline while the footprint of its demand may remain stable or increase. If, by contrast, the imports use cleaner technology or steel demand declines, the closure can reduce the total footprint.

It is therefore incorrect to describe every import as "outsourcing." Trade can shift production, make it more efficient, enable useful specialization, or simply respond to the absence of a local resource. The diagnosis requires comparing what would otherwise have been produced.

This caution avoids automatic ecological protectionism. The right accounting boundary is the one that reveals pressure without assuming in advance that local production is always preferable.

But the consumption footprint should not become a total theory of responsibility in its own right. Consumers do not single-handedly choose the shape of cities, train frequency, the efficiency of the housing stock, product lifespans, the electricity mix, or where jobs are located. Buying a car in an area designed without alternatives is not the same as buying a third luxury vehicle in an area well served by public transit.

Consumers often choose under constraint. A suburb without rail service turns a preference for access to employment into demand for car travel. Poorly insulated housing turns the need for warmth into energy consumption. A food system may make some products cheaper than their alternatives.

These constraints do not eliminate all agency. They change the cost of changing behavior. Someone who can easily substitute one option for another has a different degree of freedom than someone whose change would require moving or making a major expenditure.

We can therefore distinguish at least three levels: necessary consumption with few alternatives; discretionary consumption that is nevertheless encouraged by social norms or infrastructure; and highly substitutable discretionary consumption. A uniform policy is blind to this structure.

A just policy also has to ask how much of a footprint comes from choices that are easy to substitute and how much comes from infrastructure that locks behavior in. Degrowth would lose credibility if it first asked individuals to abandon what existing institutions still require them to use.

3. Production and Consumption Do Not End at National Borders

Territorial and consumption-based accounts diverge most sharply when wealthy consumer economies rely on industrial production abroad. An

economy can consume steel, electronics, clothing, or chemicals while locating much of the associated emissions and pollution elsewhere.

Producing countries still have their own levers—electricity systems, industrial standards, labor law, pollution controls, taxes, infrastructure—and they receive jobs, revenue, and productive capacity.

Consuming countries benefit from the final goods and can influence demand through standards, procurement, taxes, information, and consumption itself. Responsibility therefore runs through the chain rather than belonging exclusively to one end.

A global supply chain may even involve several beneficiaries and decision-makers: capital owners, the exporting state, workers, distributors, and consumers. The same metric ton of CO_2 can be assigned to each of them depending on the question being asked, without it making sense to count it four times.

This does not mean the producing country bears no responsibility. A factory is built under national law, uses local infrastructure, employs a local workforce, and may reflect the industrial choices of its government. But the consuming country cannot treat the damage as though it disappears at the border. The same activity can legitimately be viewed through several accounting frameworks because several causal and political relationships are real at the same time.

This plurality helps explain why climate-related trade policies are controversial. A carbon border adjustment can reduce leakage and narrow cost differences among producers, but it can also shift costs onto less affluent exporting economies. Its fairness therefore depends on exemptions, financing for decarbonization, the revenues at stake, and the alternatives available.

This chapter does not settle the design of such a mechanism here. It simply shows that a policy based only on the place of production or only on the place of consumption misses part of the problem.

This plurality also complicates slogans about the Global North and Global South. High-income countries use far more resources on average and generate much higher per-capita impacts than low-income countries. They also bear a large share of the historical responsibility for accumulated greenhouse gases. But current emissions are now distributed across a global

economy in which some middle-income countries have very large total emissions and very wealthy populations exist in nearly every region.

It also complicates the term "Global South." Middle-income economies now account for a large share of industrial production, but they themselves include very poor populations and elites with extremely large footprints. National borders do not replace internal distributions.

Wealthy countries also contain lower-income households whose footprints may be far below those of affluent groups in emerging economies. International justice has to consider national position and class position together rather than choosing one and ignoring the other.

The IPCC likewise notes that a large share of households in the global top decile live in developed countries, but not all of them do. The concentration is global before it is strictly national.

Two opposite simplifications have to be rejected. One says wealthy countries alone are responsible because they industrialized first. The other says current emissions from emerging economies erase historical responsibility. A serious distribution of effort has to consider history, present emissions, population, development needs, financial capacity, and internal inequality together.

A third simplification must also be rejected: treating current emissions as the sole basis of justice. Climate change depends on the accumulation of CO_2 over time. A country that emitted heavily for two centuries and is reducing emissions today has a different history from one that industrialized only recently.

Global Carbon Budget data show this historical concentration: the United States remains the largest national contributor to cumulative fossil-fuel and industrial CO_2 emissions since the beginning of industrialization, followed notably by China and Russia depending on the boundaries used. The exact ranking and shares change if land use, colonial territories, or other gases are included.

Historical responsibility is therefore real but methodologically dependent on accounting conventions. By itself, it does not determine the future burden-sharing rule.

We must also distinguish historical responsibility from present capacity. A country may have contributed little cumulatively yet now possess

substantial financial or technological resources; another may bear heavy historical responsibility while still containing vulnerable populations. Future justice therefore cannot be reduced to a retroactive bill assigned to states as though they were continuous, homogeneous persons.

Generations pose a similar difficulty. People living in a country today are not identical to those who produced all of its past emissions. But they may benefit from infrastructure, wealth, and advantages accumulated over that history. Historical responsibility can therefore be understood less as inherited guilt than as one argument for greater capacity to contribute.

This formulation avoids two excesses: erasing the past on the grounds that individuals change, or turning birth in a wealthy country into a personal moral fault.

4. Ownership Changes the Picture Again

Consumption is only one route through which economic activity is organized. Ownership adds another. Who controls the assets that produce emissions, receives their income, and can influence investment?

Owning productive capital gives a claim on income and, depending on the asset and governance structure, some degree of influence over corporate decisions. That does not make every shareholder personally responsible for every operational choice, but it does connect wealth to the structure of production.

Ownership-based carbon accounting reveals an even more concentrated pattern because financial wealth itself is highly concentrated. The World Inequality Report 2026, drawing in part on Chancel and Rehm, estimates that the wealthiest 10 percent by wealth are associated with roughly 77 percent of emissions attributed to privately owned capital. This is an accounting of ownership concentration, not a measure of identical personal culpability or control.

That result is not surprising: financial ownership is itself highly concentrated. The same report estimates that the wealthiest 10% own roughly three-quarters of global personal wealth. Ownership-based accounting therefore shifts attention from purchases to the structure of capital ownership.

This approach reveals something the consumer basket does not capture. Two people can have relatively similar day-to-day consumption yet possess radically different economic power if one controls a portfolio of companies, funds, or assets that steer investment on a large scale. Ownership opens a distinct channel of action: selecting board members, voting, reallocating capital, demanding returns, financing a technology, or withdrawing support from it.

But not all owners exercise the same power. A founder controlling a majority of voting rights, a small shareholder in an index fund, a pension fund, a lending bank, and a state shareholder occupy very different positions.

Rights to income, voting rights, the ability to appoint management, the threat of withdrawing financing, and political influence must be distinguished. A large financial stake can coexist with little direct control; an actor with a relatively small investment can sometimes wield strategic influence through credit or regulation.

Capacity to act is therefore multidimensional. An ownership footprint can indicate where economic interests in emitting assets are concentrated without, by itself, showing who was actually able to decide on a shutdown or transition.

But we must resist another temptation to oversimplify. An emission attributed in accounting terms to a shareholder is not proof that the shareholder personally ordered the emission or could easily have prevented it. An index fund, a minority shareholder, a controlling founder, and a state shareholder do not have the same power. Ownership-based attribution answers an economic question—who owns the assets associated with the emission?—not the entire moral question.

This caution also protects collective savings vehicles. An employee may indirectly own shares through a retirement fund without knowing which companies are held or having any operational voting power. Attributing emissions to that person's wealth may be economically coherent while remaining morally insufficient.

At the other extreme, a controlling owner may determine investment strategy, lobbying, or the timing of a transition. In that case, the argument from capacity to act becomes much stronger.

One rule follows: the more an ownership-based attribution is used to justify an obligation, the more it has to be paired with evidence about actual power to influence decisions.

It would also be wrong to add a consumption footprint and an ownership footprint together to manufacture a "complete" footprint. That would count the same activity from two different perspectives. The right method is to keep the questions separate: who demands? who produces? who owns? who decides? who can change the trajectory? The stronger the responsibility being claimed, the more precisely the mechanism that justifies it must be specified.

The same principle applies to production and history. An emission can be attributed to the producing country in a territorial inventory, to the consuming country in a footprint, to the capital owner in ownership-based accounting, and to a state's past in a historical cumulative account. All four entries can be correct at the same time because they answer four different questions.

Adding them together would create a quantity with no physical meaning. Using them separately, by contrast, makes it possible to design different obligations: reducing demand, decarbonizing industry, transforming investment, and making historical financial contributions.

5. Fair on Paper Can Still Be Unfair in Practice

Climate policy often works through prices. Raise the cost of carbon-intensive activity and households and firms have an incentive to switch. The logic is clear. The distribution is not.

Who ultimately pays depends on pass-through, consumption patterns, wages, profits, local alternatives, and what happens to the revenue. A carbon price imposed upstream can show up downstream in household bills, worker income, or returns to owners.

That is why distributional analysis has to look beyond the sticker price of fuel or electricity. Direct spending, indirect price effects, income changes, geography, and revenue use all matter.

The slogan "carbon pricing is regressive" is therefore too simple. So is "rebates solve the problem." Both can be true in some designs and false in others.

The American energy burden makes the asymmetry concrete. U.S. Department of Energy data show that low-income households spend about 6 percent of income on home energy on average—roughly three times the share for non-low-income households—and in some places the burden is far higher. A uniform increase in energy prices therefore does not land on a uniform margin of comfort.

Geography matters independently of income. A household in a car-dependent rural or exurban area may have few substitutes for fuel use, while an urban household with similar income may face lower transportation costs and far higher housing costs.

A fair design has to see both income and constraint. Income-only compensation can miss households locked into high energy or transportation needs; geography-only compensation can overprotect affluent households with large footprints.

There is no perfect formula. The criteria have to be public, understandable, and tied to the problem they are meant to solve.

The deeper lesson is political as well as distributive. People judge a transition not only by their net dollar position but by whether they can see who pays, who benefits, where the money goes, and whether promised alternatives actually arrive.

Perceived fairness is comparative. A household asked to absorb higher fuel or heating costs may reject the policy if it believes major polluters, wealthy consumers, or protected sectors are escaping the same effort.

That makes legibility part of policy design. Revenue that disappears into a general budget, opaque exemptions, or endlessly delayed alternatives can undermine trust even when the incidence model looks favorable.

A household should be able to answer a few basic questions: who pays, who receives, where the revenue goes, what exemptions exist, which alternatives are being built, and how outcomes will be checked.

Rules that change constantly, or revenues whose connection to the stated goal is hard to see, weaken institutional credibility.

Trust is therefore an implementation variable, not a public-relations afterthought.

Material fairness still does not guarantee support. People can distrust forecasts, underestimate rebates, overestimate personal costs, or doubt that promised investments will appear. A policy can be progressive on paper and politically fragile in practice.

The stronger conclusion is that distributive justice, procedural legitimacy, and climate effectiveness are separate tests. None substitutes for the others.

A measure can distribute costs fairly and still be imposed through a process people reject. It can be procedurally legitimate and environmentally weak. It can cut emissions sharply and remain politically unstable.

A durable transition has to hold all three together as far as possible.

6. Revenue Can Redistribute—But Politics Still Matters

Pricing carbon creates revenue that can be used in several ways: direct household payments, targeted relief, lower taxes elsewhere, public transportation, retrofits, clean-energy infrastructure, or community investment. Each choice changes both distribution and politics.

A uniform rebate is simple and visible. Targeted support can protect vulnerable households more precisely. Infrastructure spending tackles the constraint itself but often reaches people more slowly. There is no single distributional design hidden inside the price signal.

The key distinction is between the marginal incentive and the use of revenue. Carbon can remain expensive at the margin while revenue is returned or invested in ways that protect lower-income households.

Targeting brings its own trade-offs. More precision can create benefit cliffs, administrative burden, or mistrust. Infrastructure can be more transformative than cash while also being less immediate.

The principle is simple; implementation is not. Regional differences, indirect prices, labor-market effects, and household heterogeneity can change who ultimately wins or loses.

Washington State offers a useful American case because its Climate Commitment Act does more than put a price on emissions. The cap-and-invest system dedicates auction revenue to climate and air-quality investments and embeds explicit environmental-justice requirements into the use of those funds.

State law requires at least 35 percent of auction revenue to benefit overburdened communities and at least 10 percent to support projects with Tribal backing. During the 2023–2025 biennium, state agencies reported that about 57 percent of invested auction revenue went to vulnerable communities.

The program therefore illustrates a structural alternative to treating carbon revenue as undifferentiated public money: revenue can be tied to transportation, resilience, air quality, and communities already carrying disproportionate burdens.

But design does not eliminate politics. In 2024, Washington voters faced Initiative 2117, which would have repealed the Climate Commitment Act. The repeal was rejected by 61.95 percent of voters.

That result should not be turned into proof that carbon pricing is easy or universally popular. It shows something narrower: a carbon-pricing system can survive a direct repeal vote when its revenue use, institutional structure, and political coalition are part of the package.

The Washington case also guards against the opposite mistake. Revenue earmarks and justice provisions do not prove that every household is fully compensated or that every local burden disappears.

The right lesson is conditional: price, revenue use, trust, alternatives, geography, and political competition jointly determine durability.

Carbon pricing is therefore neither automatically regressive nor automatically just. Its distributional effect depends on the design surrounding the price.

Infrastructure remains essential. Two households with the same income can face very different costs depending on housing quality, commuting distance, transit access, health, occupation, or climate.

An atypical household can lose even under a policy that is progressive on average. Someone with a medical need for intensive heating or cooling, a tradesperson who depends on a vehicle, or a rural family far from services may face costs that income alone does not predict.

A just transition needs exceptions without allowing exemptions to multiply until the signal disappears.

That is a familiar policy-design problem: perfect tailoring can make a system opaque, expensive, or impossible to administer.

Temporary compensation is strongest when it creates a path out of dependence—a retrofit, transit option, cleaner technology, or other durable alternative.

7. The Global South Does Not Need Less of What It Still Lacks

The international dimension forces a clarification. If degrowth meant lower production and consumption everywhere, it would be morally indefensible. Hundreds of millions of people still need safer housing, reliable electricity, health care, sanitation, transportation, varied diets, and productive equipment.

Material living standards differ too widely for uniform contraction to make sense. The Global Resources Outlook estimates that low-income countries use roughly six times fewer resources per person than high-income countries. Internal inequality complicates the picture, but not the basic asymmetry.

Necessary development often means building physical stocks: housing, water systems, sanitation, hospitals, schools, reliable energy, transportation, and productive equipment. Those stocks require material and energy flows. Ecological limits cannot become a mechanism for freezing existing deprivation in place.

Some parts of the world will therefore need rising material flows while others reduce theirs.

The Global Resources Outlook underscores how sharply resource use differs by countries' income levels. A large part of the problem lies precisely in the gap between economies with very high material consumption and populations that have not yet reached a satisfactory level of essential services.

But the right to development does not mean a right to reproduce every form of consumption found in wealthy countries. A reliable electric grid and a fleet of luxury vehicles are two very different forms of material growth. Food cold-chain infrastructure and annual smartphone replacement do not meet the same need.

The criterion must remain the capability created. This opens a pathway in which countries build more essential stocks while avoiding, where possible, some costly fossil-fuel or urban lock-ins.

This possibility also depends on technology transfer, financing, and trade conditions. Asking a poorer economy to choose cleaner infrastructure without giving it access to the necessary capital simply shifts the cost of the transition.

The coherence of degrowth therefore depends on an explicit asymmetry: some flows must decline sharply, while others can and should increase. A country that builds water systems, hospitals, decent housing, or public transportation can increase some forms of material consumption without contradicting the project's purpose. The question is not to keep every territory below the same production ceiling; it is to organize a global ecological space in which what is necessary can grow where it is lacking while excess declines where it is concentrated.

This asymmetry also exists within countries in the Global South. Very high-income groups may have footprints comparable to or larger than those of affluent households in the Global North while millions of people lack reliable electricity or safe housing.

A policy based only on nationality can therefore reproduce internal injustice. The principle of a "right to development" must be tied to missing capabilities and the groups concerned, not used as an indiscriminate justification for any national expansion.

This distinction does not resolve the exact distribution of effort. How much weight should historical responsibility carry? Current income? Population? Wealth? Technological capacity? Vulnerability? Science can document each dimension; it cannot by itself produce the moral coefficient that would add them together. Burden-sharing is a political decision constrained by facts, not a hidden formula waiting in the data.

Each criterion reflects a different intuition. Cumulative emissions speak to past contribution; current emissions to present pressure; population to equality among persons; income and wealth to capacity to pay; vulnerability to the need for protection; technological power to the capacity to transform.

These criteria are not naturally commensurable. Building an index that assigns them weights of 30%, 20%, or 10% would not eliminate political choice; it would hide that choice in the coefficients.

An honest international negotiation has to state the principles it combines instead of pretending that a scientific formula can generate justice on its own.

The same state can also occupy different positions depending on the criterion: low historical responsibility but high current emissions; high vulnerability but middle income; low average income but very wealthy elites. That is why no single axis is sufficient.

8. Justice Is Part of Whether a Transition Works

Distribution is not an ethical appendix to climate policy. It changes whether the transition can happen at all.

Environmental harm is distributed too. A group can contribute very little to emissions and still face more heat, pollution, flooding, wildfire smoke, or food insecurity. Responsibility and vulnerability are not mirror images.

Vulnerability depends on exposure and on the ability to absorb loss. The same heat wave, flood, or insurance shock can produce radically different outcomes depending on housing quality, savings, health coverage, infrastructure, and access to assistance.

It also depends on the ability to leave or adapt. A family that owns a flood-threatened home but has insurance coverage, savings, and access to a liquid housing market does not face the same risk as a family with no savings whose entire wealth is tied up in that same home.

Ecological harms therefore become a multiplier of preexisting inequalities. A disaster destroys an asset; the ability to rebuild then depends on credit, insurance, property rights, public assistance, and social networks. The same physical event can produce very different social trajectories.

This dimension prevents us from limiting climate justice to the distribution of policy costs alone. Doing nothing has a distribution too.

This asymmetry provides an additional reason to protect low-footprint groups: they may be both less responsible for the pressure and less able to bear its consequences.

A policy perceived as unjust can trigger refusal, evasion, electoral reversal, or abandonment. A policy that makes a household locked into an old boiler pay more without giving it access to a retrofit may reduce its income without reducing emissions enough. A car ban in an area without transportation alternatives may shift the problem rather than solve it. By contrast, a financed retrofit, a usable rail network, or a compensatory transfer can make possible a change that price pressure alone could not achieve.

The mechanism can become self-defeating. A tax without an alternative creates a cost; the cost fuels opposition; the opposition causes the policy to retreat; carbon-intensive infrastructure remains; households stay locked in. Justice is therefore not merely compensation after the policy: it must be built into policy design.

Conversely, a policy that funds alternatives before tightening a constraint can reduce the cost of change and increase effectiveness. The sequencing of measures therefore becomes a dimension of justice.

Inequality also acts upstream. The more unequal a society is, the more status comparison and positional consumption may matter, as we saw in Chapter 2. Inequality can also reduce trust in the fairness of shared sacrifice. Why accept a restriction when highly visible conspicuous consumption remains untouched? Why believe in a common necessity if losses are socialized while gains remain private?

It can also affect political power. Actors with more capital can fund expertise, lobbying, campaigns, and legal strategies. Economic interests therefore do not all have the same capacity to turn a private preference into a collective rule.

This dimension does not allow us to infer politics automatically from wealth: businesses and wealthy people do not form a single bloc, and economic coalitions can support the transition. It simply prevents us from treating the political marketplace as an equal aggregation of preferences.

Justice then becomes a functional condition of the transition. This does not mean every unpopular measure is unjust or every just policy will automatically be popular. It means that an ecological program that

ignores distribution, power, and alternatives deprives itself of part of its chance to succeed.

This function can be evaluated concretely: does the measure reduce disparities in the capacity to adapt, avoid concentrating losses on groups with few alternatives, and preserve a coalition strong enough to endure? These criteria do not reduce justice to a single calculation; they simply require us to verify that its institutional translation produces observable effects.

The symmetry must be preserved. A highly popular measure may be ecologically ineffective; a just measure may fail technically; an effective measure may require real effort. Justice does not replace evaluation of outcomes.

It does, however, increase the likelihood that a policy can endure long enough to produce those outcomes. A transition that changes direction with every distributive crisis cannot transform infrastructure over several decades.

9. What Degrowth Should Reduce—and What It Must Protect

"Everyone must consume less" is too crude to survive serious distributional analysis. It erases needs, constraints, and responsibility at the same time.

A stronger rule comes in stages. First, protect a floor of capabilities: food, housing, health, essential energy, and necessary mobility. Second, reduce high-footprint uses first where substitutes exist and the additional benefit is small. Third, ask more of people with greater income, wealth, and capacity to act. Fourth, finance the alternatives that make lower-resource choices genuinely possible.

That sequence avoids a false choice between individual responsibility and structural change. Both matter; their relative importance changes by activity and circumstance.

It also helps choose instruments. A ban can make sense where alternatives already exist and the harm is high. Pricing may work better when uses vary widely. Public investment belongs first where the central problem is lack of alternatives. Transfers are necessary when people face the constraint before the infrastructure can change.

No instrument is virtuous by itself. The test is the ecological and distributive function it performs.

A more precise rule would be this: high-footprint consumption and investment should fall first where they are largest, easiest to substitute, and least necessary; essential needs should be protected; low-impact infrastructure may need to expand; and the burden should reflect not only income but wealth, practical freedom to change, and local constraints.

Investment matters because direct consumption is only part of the picture. A wealthy household can lower its personal emissions while continuing to hold a carbon-intensive portfolio. A lower-income household may own little wealth yet remain trapped by an inefficient home or fossil-dependent vehicle.

Those are different policy targets. Rules aimed at wealth and portfolios address ownership and finance; rules aimed at consumption address demand and use.

This is still not a complete policy program. It does not tell us the tax rate, the flight allowance, the wealth threshold, or the quota. Those choices still have to survive tests of freedom, employment, investment, leakage, institutional capacity, and democracy.

But it does give us failure criteria. A policy fails distributively if it cuts essential consumption before easily substitutable luxury use; imposes large costs without realistic alternatives; protects asset owners more than exposed households; or demands contraction from people who still lack basic capabilities.

A policy can also be fair and ecologically ineffective. The two tests remain separate: is the distribution defensible, and does physical pressure actually fall?

The target is no longer average degrowth. It is to reduce excess while expanding what is still missing. That is what turns sufficiency from generalized austerity into a distinction between two different problems: deprivation and overuse.

The same change reshapes the meaning of progress. More consumption can be progress for a household that needs heat, mobility, nutrition, or secure housing. Less consumption can be almost costless for a household

giving up waste or a low-value status use. Direction alone tells us nothing; function and starting point matter.

That asymmetry is what keeps degrowth from becoming green austerity.

Equal rules do not guarantee equitable outcomes. The same material reduction can impose radically different sacrifices on households with different incomes, assets, needs, and alternatives.

Differentiated burdens are not a license for arbitrary treatment. The criteria have to remain public, revisable, and tied to observable functions: need, capability, footprint, power to act, and vulnerability.

Methodological Notes and Limits of the Evidence

This section preserves the evidentiary limits of the chapter rather than serving as a second conclusion.

- Emission shares by decile vary by year, dataset, and accounting convention. The chapter uses them as evidence of concentration, not as timeless constants.
- Territorial, consumption-based, and ownership-based accounts answer different questions and should never be added together as though they measured one common quantity.
- The Washington case is used as an American example of carbon-pricing design, earmarked revenue, environmental-justice requirements, and political durability. It does not establish that every household was compensated or that the program would transfer unchanged to other states.
- The Global South discussion does not treat nations as internally homogeneous; the chapter explicitly distinguishes national income levels from inequality within countries.
- Detailed policy design is deferred to the institutional and transition chapters.

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PART III — BUILDING AN ECONOMY OF ENOUGH

CHAPTER 7 — Enough: Needs, Security, and Wealth Without Endless Accumulation

Degrowth has a built-in political problem: the word tells us what should decline far more clearly than what should be protected, expanded, or made possible. After six chapters of diagnosis, that is no longer a minor weakness. If all we know is that some forms of production must shrink, we still do not know what kind of society should replace them.

The previous chapter showed why uniform contraction makes no sense. Some people already have far more than they need for a decent life; others still lack safe housing, health care, reliable energy, mobility, or time. "Less for everyone" would turn ecology into austerity. But "everyone decides for themselves what is enough" is not enough either. Choices are shaped by infrastructure, markets, social norms, and shared physical limits.

So "enough" needs positive content. Not a universal ration. Not a morality of frugality. Not a ban on desire. It should describe a society that guarantees essential capabilities, allows many ways of meeting them, and stops treating ever-higher material consumption as the default answer to every human aspiration.

1. Enough Is Not the Same as Less

A society organized around sufficiency may need more trains, renovated homes, nurses, schools, electrical grids, research, or production of some materials. It may want more music, care, knowledge, safety, free time, or public beauty. What it rejects is not every increase. It rejects the idea that total production must keep expanding indefinitely for the system to remain stable.

Three different tasks belong under the word enough. Build capabilities where they are missing. Maintain existing capabilities with fewer material

flows where possible. Reduce forms of consumption that add little capability while imposing high costs.

That asymmetry is the whole point. Cutting necessities and luxuries together is austerity, not sufficiency. The question is not whether a quantity rises or falls. It is what function that quantity serves.

A train station, a hospital, or an energy retrofit consumes materials. Expanding them may later reduce more dispersed forms of private consumption. The balance should therefore not be judged by the initial investment alone, but by the capability created and by the flows it avoids or makes unnecessary over time.

This distinction changes the meaning of the debate. The question is no longer: "how do we convince people to accept less?" It becomes: "what forms of wealth do we want to guarantee, and which of them truly require more matter?" A serious answer must go down to concrete services: being warm, getting around, eating, receiving care, learning, participating, meeting others. These functions are what matter, not the gross volume of goods mobilized to obtain them.

The contrast can be seen in an ordinary household budget. One family may spend more because its home is far from jobs, poorly insulated, and dependent on two cars. Another may spend less while still having comfortable housing, a nearby school, reliable transportation, and accessible health care. If spending is confused with well-being, the first family appears "richer." If we look at the services actually obtained—warmth, access, safety, time—the ranking may reverse. Sufficiency therefore begins with a simple but demanding intellectual operation: measure what resources make possible, not merely how much they cost.

This budget also reveals a difference between voluntary spending and compensatory spending. A household may pay more for energy because its home is inefficient, more for fuel because employment is far away, or more for private services because a collectively provided service is unavailable. High spending can then signal less freedom rather than greater wealth.

Reducing spending without transforming the constraint can make people poorer. Reducing the constraint can lower spending while increasing capabilities. This distinction provides one of the most concrete criteria of sufficiency: first eliminate the expenditures made necessary by poor organization.

This operation also changes how we talk about poverty. A sufficiency policy that merely sets an average level of consumption could reduce flows while leaving some households trapped in inefficient housing, high rents, or car dependence. It would have reduced aggregate consumption without increasing capabilities. Chapter 4 had already separated means from ends; here that distinction becomes a rule of economic design.

2. Needs, Satisfiers, and the Systems Around Them

The word need creates trouble in both directions. Define it too broadly and every desire becomes a need. Define it too narrowly and human life collapses into biological survival. The useful distinction lies between the capability that matters and the particular object, service, or infrastructure used to provide it.

Nutrition is a capability. A specific meal is a satisfier. A refrigerator is a preservation technology. Reliable electricity is infrastructure. When those layers are collapsed, historically contingent objects start to look like timeless human necessities.

But satisfiers are not freely interchangeable either. Someone may depend on a car because the place they live was built around driving. The need is mobility, not the car; the car can still be the only realistic way to meet that need under present conditions.

Sufficiency therefore has to work on two time horizons: protect the satisfiers people need today, then change infrastructure so that better options become available tomorrow.

We can call needs or fundamental capabilities what enables a person to live, act, participate, and develop real autonomy: nutrition, health, shelter, safety, relationships, learning, relevant mobility, and social participation. But these needs do not dictate a single means. Mobility can be provided by walking, cycling, trains, buses, or cars depending on the territory. Staying warm may require a great deal or very little energy depending on the building. Participating in culture may involve a book, a stage, a screen, or a collective celebration.

A satisfier is therefore different from a need. It is the concrete, historical, and technical form through which a society makes a need accessible. This distinction protects against both the market and the paternalistic planner. The market can no longer claim that every desired commodity is a need;

the planner can no longer claim that a human need dictates one correct way of satisfying it.

We can add a useful distinction between private and collective satisfiers. A private vehicle directly satisfies its owner's mobility needs; a rail network or bus line provides a shared capability. An individual boiler and a district heating network meet the same need through different architectures.

The choice between these forms changes material flows, fixed costs, resilience, and autonomy. A collective satisfier can reduce material use per person through sharing; it can also become rigid or poorly adapted. A private satisfier can offer considerable flexibility; multiplied by millions, it may require far more physical stock.

There is therefore no automatic moral superiority of the collective. The criterion remains: what architecture provides the capability, at what cost, with what alternatives, and with what dependence?

This also helps explain why two societies can provide comparable standards of living with very different material flows. The need for mobility does not require fifty kilometers of daily driving. It requires access to relevant people, jobs, and services. A city where these functions are close together can satisfy the same need with far less motorized travel than a dispersed city where every activity is separated by a highway.

Work on provisioning makes this proposition more precise. Energy and matter do not turn directly into health, mobility, or education. They pass through infrastructure, prices, public services, housing markets, spatial organization, and income distribution.

Two cities can use similar amounts of transportation energy while providing very different levels of accessibility if one requires people to travel long distances and the other brings everyday functions closer together. Two housing systems can use comparable amounts of floor space yet produce very different costs depending on location, insulation, and security of tenure.

Provisioning efficiency is therefore not merely technological. It is institutional and spatial.

This separation between need and satisfier avoids another trap: naturalizing the current form of consumption. The need to preserve food is not the need for a 600-liter refrigerator; the need to be clean is not the

need for a fifteen-minute shower at a high flow rate; the need to communicate is not the need to replace a phone every two years. Satisfiers can be improved, shared, simplified, or replaced without denying the need.

But this distinction cannot be used against people. We cannot decide from behind a desk that a trip, an extra room, or a digital connection is superfluous without knowing the circumstances. A separated parent may need a room for their children; a night-shift worker may depend on a car where transit does not run; a disabled person may need more space, energy, or equipment. The means have to remain contextual even when the objective is firm: protect capabilities without making their provision unnecessarily material-intensive.

3. Good Lives Depend on Provisioning Systems, Not Just Resource Quantities

Research on Decent Living Standards and the IPCC points to a crucial fact: how much energy and material a decent life requires depends heavily on how services are organized. Climate, density, housing quality, transportation, health care, and infrastructure all change the resource cost of meeting the same need.

That is why Decent Living Standards begin with services and capabilities —safe housing, nutrition, mobility, health, education, communication, thermal comfort—rather than with a fixed basket of consumer goods.

A 2025 Nature Sustainability study estimates that, if new material stocks were directed only toward deficits in Decent Living Standards, roughly a 12 percent increase in existing global socioeconomic material stocks could close the identified gaps. That is not a universal quota or a simple policy prescription. Its significance is different: meeting basic material needs worldwide does not require reproducing the stock levels of the richest societies everywhere.

The same result reveals the distributive question: additional stocks need to be built where capabilities are lacking, while already highly equipped economies can concentrate their efforts on maintenance, renovation, and transformation.

Vogel and colleagues compared 106 countries and found wide variation in human outcomes at similar levels of energy use. Above roughly 60

gigajoules of final energy per person in their data, more energy is associated with very little average improvement across several dimensions of need satisfaction; yet even among countries above that level, not all adequately satisfy the needs examined. Energy alone therefore guarantees nothing.

This result does not identify a model country. A country may be energy-efficient yet perform poorly on certain freedoms; another may achieve good health outcomes with a favorable demographic structure. Provisioning correlations point to mechanisms worth examining, not a ranking of civilizations.

The significance of the result is more modest: the amount of energy alone does not explain capabilities. That is enough to open political space between deprivation and high consumption.

The same authors show that public-service quality, equality, democracy, access to electricity, transportation infrastructure, and health coverage are associated with better human outcomes for a given amount of energy. Belgium already exceeds the reference levels of public-service quality, equality, and low extractivism used in their joint scenario; several other European countries come close. This does not make any of them an ecologically sustainable society. It only shows that institutional architecture changes the human return on a unit of energy.

The urban case makes this mechanism visible. A 2026 study of 662 cities finds that a ten-percentage-point increase in the share of residents with access to their daily services within a fifteen-minute walk or bike ride is associated with about 5% lower transportation emissions per capita. The result does not say that the "15-minute city" solves all of urban ecology. It shows that access can increase while the required amount of motorized travel decreases.

An access policy must also consider people whose routines do not fit within a neighborhood: night-shift work, specialized medical care, separated families, and mobile occupations. Proximity reduces some travel obligations; it does not make intercity mobility unnecessary.

Thus, "fewer kilometers" never becomes an end in itself. The goal remains access, with the least material dependence compatible with people's life choices.

But proximity is not yet accessibility. A school eight minutes away on foot may be inaccessible if it has no available places; a nearby health center may be useless if appointments are unavailable; a neighborhood store may be too expensive. Distance is one component of the service, not the whole of it.

Recent work on the 15-minute city underscores the same limit. High average proximity can coexist with large differences by age, income, disability, or transit access. What matters is actual access, not a circle drawn around a home.

This clarification also protects nonurban areas. A rule designed for a compact metropolis cannot become a universal standard for a rural valley, an island, or a small town. The need for access remains common; territorial satisfiers differ.

Sufficiency is therefore first of all a question of organization. Asking everyone to consume less within infrastructure that requires high consumption is a policy of deprivation. Transforming infrastructure so that the same service requires fewer resources is a policy of sufficiency.

We can make this mechanism even more concrete with health care. Two countries can spend similar amounts on health care while achieving very different outcomes depending on prevention, primary care, drug prices, hospital organization, and social inequality. Spending more is not the same as being better cared for. An economy of sufficiency therefore seeks institutions that turn a resource into a service with the least economic and material loss.

Health care also shows why sufficiency is not the same as minimizing spending. A longer medical consultation, more staff in geriatric care, or an expensive medical technology can increase the resources used while improving a fundamental capability.

Conversely, some medical spending compensates for avoidable determinants: pollution, substandard housing, accidents, and working conditions. A society can become richer in health by spending more on some forms of care and less on the causes that make that care necessary.

Care creates a particular difficulty. An essential part of its quality comes from human time itself: listening, helping, accompanying, and monitoring. There are organizational gains and useful technologies, but

continuously compressing time per person eventually changes the service being provided.

Health care is also a case in which the word "enough" can become dangerous. Reducing unnecessary procedures, avoidable hospitalizations, or administrative tasks is desirable; setting an a priori maximum amount of human presence can degrade the service.

In some areas, post-growth wealth may therefore mean more human time and less matter: more caregivers, more support, but fewer avoidable illnesses, trips, or inefficient buildings.

This recomposition illustrates why the chapter must always reason in terms of functions rather than aggregate volume.

A sufficiency economy may therefore devote a larger share of activity to labor-intensive sectors. Material productivity elsewhere can help free the resources those sectors need.

The same reasoning applies to housing. Insulating a building, reducing heat loss, and bringing services closer together can durably reduce the energy required without asking residents to "put up with the cold." By contrast, asking everyone to lower the thermostat in a poorly insulated housing stock turns a collective inefficiency into individual discipline. Provisioning therefore makes it possible to distinguish chosen restraint from imposed deprivation.

We can test the notion of enough across four separate dimensions: space, quality, location, and stability. A home can be small but very well located, large but energy-intensive, well insulated but threatened by eviction, or stable but cut off from services.

A policy that looks only at floor area risks confusing two opposite situations. An extra room may be a luxury in a small household or a necessity to avoid overcrowding. The same number of square meters does not have the same meaning depending on household composition and use.

This heterogeneity is precisely why sufficiency should favor functions and quality thresholds over uniform quotas.

The international comparisons by Vogel et al. are useful precisely because they show wide variation: countries use similar amounts of energy but do not achieve the same social outcomes. This means that part of the room

for maneuver lies in collective organization—public services, equality, accessibility, infrastructure—and not only in consumer virtue.

The variation indicates that there is room for organizational change. It does not prove that a country performing well on one dimension could be copied mechanically elsewhere. Climates, densities, urban histories, and institutions differ.

But it does disprove a simpler claim: the level of human services is not a fixed function of the amount of energy. Between energy and outcomes lie institutions that policy can change.

That room for maneuver is the practical core of sufficiency. If capabilities could increase only with flows, every reduction would be deprivation. Because the conversion system matters, part of the transition can consist in converting better rather than simply rationing.

4. There Is No Single Income Line Called "Enough"

It would be convenient to find one income threshold beyond which money stops improving life and call everything above it "enough." The evidence does not support such a clean cutoff. Well-being continues to respond to income differently across people and contexts, and the relationship does not collapse into one universal number.

What matters more for this chapter is comparison. A 2026 study covering more than 90,000 people in 109 countries found that, in four out of five countries, a person's rank in the national income distribution was more strongly associated with subjective well-being than absolute income or relative deprivation. The association was stronger where materialist values were more prevalent and weaker where civic engagement and social capital were higher.

Rank matters because positional competition has no obvious finish line. If part of the reward comes from staying ahead, everyone can become richer without ending the race.

This mechanism does not imply that absolute wealth fails to improve life. It implies that a policy relying on average income growth alone to satisfy the need for recognition runs into a logical limit: everyone can become richer, but not everyone can be above average.

This result must be interpreted cautiously. It does not prove that absolute income is useless. In poor countries, or for someone deprived of housing, health care, or security, income remains an essential means of gaining real access to these things. The authors themselves show that part of the relationship with absolute income reflects infrastructure and development available at the national level.

But it reveals a structural problem. If part of the satisfaction produced by higher income comes from being above others, not everyone can win that race at the same time. When everyone's income rises but their rank remains unchanged, society has mobilized more production without necessarily eliminating the comparison mechanism. An economy that depends on monetary status thus turns a relative aspiration into a potentially endless material driver.

The answer is not to prohibit status or emulation. People find prestige in creation, skill, care, exploration, beauty, or public contribution just as they do in expensive goods. The political problem is rather to avoid organizing every form of recognition around purchasing power.

A society can nevertheless change the arenas in which prestige is awarded. Status associated with mastery of an art, a scientific discovery, a civic contribution, or a skill can be very intense without requiring the same quantity of matter as a race for larger homes, vehicles, or travel.

This possibility cannot be programmed. An institution can fund culture, recognize certain contributions, or limit highly damaging conspicuous uses; it cannot command what the population will admire.

A shift in prestige is possible, but the system cannot depend on it. Cultural change may help; it cannot be a hidden precondition for stability.

So-called positional goods make this dynamic especially visible. A longer car, a more expensive address, or a prestige garment derives part of its value from signaling difference. If everyone gains access to the same signal at once, the hierarchy shifts to another one. The race can therefore continue even when the functional need—to get around, to dress, to live somewhere—has long been satisfied.

We must distinguish a purely positional good from a mixed good. A large house provides both more space and a status signal; a powerful car offers performance and distinction; clothing can be both comfortable and

symbolic. A policy that tried to isolate the exact positional share of every purchase would be unworkable.

The useful level of analysis is therefore collective: some categories are strongly driven by comparison and generate material races. Reducing inequality, regulating certain externalities, and providing alternative satisfiers can reduce the pressure without having to probe each buyer's motivation.

This does not mean that every high expenditure is pure social display. People also value comfort, quality, novelty, or aesthetics for their own sake. But when a social institution turns income into the primary language of success, comparison becomes a structural driver. The result from Quispe-Torreblanca et al. is important here: the link between income rank and well-being is much weaker in societies where civic engagement is strong. This suggests at least one institutional possibility: multiply the sources of recognition that do not depend directly on purchasing.

5. Time Is Wealth Only If People Control It

Productivity gains can be used in several ways. We can produce more with the same hours, keep output stable and work less, improve quality, expand services, or combine those choices. Growth-oriented systems tend to treat more output as the normal destination.

But productivity is really a distributional choice. Gains can show up as lower prices, higher profits, higher wages, shorter hours, or new investment. Institutions and bargaining power determine which channel wins.

That is why shorter working time is not simply a cultural preference for leisure. It is one possible way to distribute productivity gains.

Recent four-day-workweek trials show that another conversion is possible in some contexts. A study published in 2025 followed nearly 2,900 employees in 141 organizations across six countries that reorganized their work before a six-month trial with no reduction in pay. Burnout, job satisfaction, mental health, and physical health improved relative to control organizations.

It would nevertheless be irresponsible to turn this into a general law. The organizations participated voluntarily; not every occupation can compress

or reorganize work in the same way; improvement over six months does not guarantee that a national system would produce the same effects. Above all, not being at work does not necessarily mean controlling one's time.

Some sectors require continuous presence and must replace eliminated hours with additional hiring. Others can reduce meetings, automate tasks, or reorganize teams. The costs differ radically.

Shorter hours can also intensify work if output targets remain unchanged. Any serious trial has to track fatigue, breaks, pace, and unpaid or off-the-clock work, not just scheduled hours.

The result from Fan and colleagues is interesting precisely because the organizations reorganized work before the trial. The reduction was not simply the removal of one day; it was an organizational transformation.

Domestic work and care remain very unevenly distributed. A systematic review of the literature on working-time preferences identifies gender and family responsibilities among the most robust factors. Studies of flexible work arrangements even show that they can increase women's domestic workload when gender norms remain traditional. And recent qualitative research on the four-day workweek distinguishes genuinely free time from time absorbed by residual paid work and domestic reproduction.

This distribution also has career effects. More unpaid care can reduce future income, seniority, and pension entitlements. Freeing time from paid employment without correcting this distribution can therefore improve the present while worsening a future inequality.

A coherent time policy has to look across at least three horizons: the workday, the life course, and long-term economic security.

Consequently, "working less" is wealth only if the freed time actually becomes available. A work-time reduction policy that silently increased women's domestic work or intensified the remaining four days would merely shift the cost. Sufficiency must count autonomous time, not simply hours removed from the payroll.

That availability also requires income security. Someone who voluntarily reduces working time while maintaining income does not have the same experience as someone involuntarily confined to part-time work while seeking more hours.

An average-hours statistic can therefore improve while insecurity rises. Temporal sufficiency requires looking simultaneously at duration, income, predictability, and control.

Time also has a property money does not: it cannot be accumulated beyond the day. A billionaire and an employee have the same number of hours, but not the same control over those hours. Commuting, permanent availability, fragmented schedules, domestic tasks, and insecurity can absorb almost all time not sold as labor. An economy that increases income at the cost of total availability can therefore make people richer in money and poorer in time.

This property gives particular value to services that save constrained time: reliable transportation, proximity, simple administrative procedures, child care, and accessible health care. Infrastructure can be materially costly and still generate substantial temporal wealth.

Conversely, a form of consumption can appear to save time while creating time pressure elsewhere: rapid delivery, faster transportation, permanent availability. Time saved by one person can become pressure on another. The balance must follow the labor chain.

This idea gives concrete content to the conversion of productivity. If a task takes 20% less time because of a technical improvement, society can turn that gain into more production, fewer hours worked, higher quality, or a combination of these uses. Technology dictates none of these choices. Productivism appears precisely when increasing volume becomes the default use of saved time.

Sufficiency has to distinguish at least three kinds of time: paid work, care, and genuinely autonomous time. Reducing the first can simply shift burdens into the second. The goal is not a flattering average of free hours; it is to see who actually gains control over their time.

6. Sufficiency Cannot Mean a Minimalist Civilization

The language of basic needs carries its own danger. A society that guarantees enough food, shelter, and survival could satisfy a narrow technical standard while remaining deeply poor in human terms.

The floor cannot become the horizon. A good society also needs room for friendship, play, invention, knowledge, discovery, culture, beauty, and experimentation.

Sufficiency therefore has to make room for selective abundance: more time, knowledge, care, public space, cultural access, and relationships without assuming that abundance must always mean more privately owned objects.

Human aspirations are open-ended. People will continue to want to create, travel, compete, experiment, collect, perform, discover, and pursue status. A viable post-growth society cannot depend on those motivations disappearing.

The issue is not whether an aspiration is legitimate. It is what material form it takes and what shared costs follow from that form.

Music requires instruments, venues, transportation, and energy, but musical ambition does not require replacing every instrument every year. Scientific research can require highly material infrastructure while producing knowledge whose value bears no simple relationship to household consumption.

Some aspirations will remain materially expensive. Long-distance travel, large collections, motorized recreation, or major scientific instruments all have real physical costs. The existence of those costs does not turn the desire itself into a moral defect.

The distinction between judging a desire and judging the means used to satisfy it is essential. Environmental policy should regulate shared consequences without becoming a tribunal of private preferences.

"Immaterial" is therefore a dangerous word. Hospitals use steel and electricity. Concerts use buildings and transportation. Digital services use data centers, networks, terminals, and power. The useful comparison is not matter versus spirit; it is material intensity relative to the value and capability produced.

Digitalization illustrates both possibilities at once. A digital library can expand access at very low marginal material cost, while rapid device turnover can recreate high material pressure elsewhere in the system.

The same caution applies to public provision. Public ownership does not make an activity automatically resource-efficient. An oversized public

building or underused vehicle fleet can waste resources just as easily as a private one.

Sufficiency therefore follows function, not legal ownership: what capability is created, and what physical flow is required to create it?

Some socially valuable ambitions will remain resource-intensive—major hospitals, rail systems, climate adaptation, ecological restoration, scientific infrastructure. A sufficiency society can expand them if the value justifies the material cost and lower-value uses contract elsewhere.

Climate adaptation makes the point clearly. Levees, water systems, insulation, urban cooling, and reconstruction may require periods of intense building. A post-growth society can still build aggressively when a necessary stock is missing or threatened.

What distinguishes it from generalized growth is that expansion has a defined function and can stop when the needed stock exists.

That is why degrowth must not become an aesthetic of smallness. The aim is not to make everything modest-looking. The aim is to stop making permanent material expansion the condition of collective success.

The same reasoning applies to climate adaptation. Levees, water systems, insulation, urban greening, or reconstruction may increase material stocks in order to protect capabilities that are already under threat. A society of sufficiency can therefore go through periods of intensive construction.

What distinguishes it from a generalized growth economy is the targeted function and the possibility of stopping expansion once the necessary stock has been reached.

Large scientific instruments are a revealing example. A particle accelerator or giant telescope can mobilize metric tons of materials and large amounts of energy for an activity that barely increases households' daily consumption. A purely quantitative rule might classify it as excess; a capabilities-based policy can recognize its scientific value.

This exception does not mean science is exempt from limits. It shows that ceilings must be applied through explicit trade-offs rather than through a doctrine that treats every large infrastructure project as suspect.

This shift is essential if degrowth is not to become an aesthetic of modesty. The goal is not for everything to look small; the goal is for material

expansion to cease being the general condition of success. A beautiful municipal library may be more materially costly than a mediocre one and yet reduce the need for individuals to purchase thousands of books. Collective wealth can therefore sometimes require an initial material investment in order to reduce private duplication later on.

7. Who Gets to Decide What Counts as Enough?

This is the hardest political objection to sufficiency. The moment society distinguishes need, luxury, excess, and waste, someone appears to be drawing a line. Why should a government, expert, or majority get to say that a house is too large, a trip unnecessary, or a vehicle excessive?

That objection defeats authoritarian sufficiency. No expert panel can scientifically derive the good life. Lists of needs and capabilities are analytical tools, not licenses to erase cultural pluralism or disagreement.

But it does not eliminate all collective limits. We already restrict some uses when they affect safety, health, neighbors, scarce infrastructure, or shared environmental systems. Choosing no limit is itself a political decision because access to shared resources then depends more heavily on purchasing power.

A liberal sufficiency framework therefore needs two separate boundaries. A floor protects what everyone should be able to reach: decent housing, health, necessary mobility, participation, essential energy, and a meaningful minimum of time. A ceiling applies to shared pressures such as emissions, extraction, land conversion, congestion, or scarce collective resources.

The two boundaries rest on different justifications. The floor protects dignity and autonomy. The ceiling protects others from harm and preserves shared physical conditions. Keeping them separate prevents the state from claiming authority over both what people need and what they ought to desire.

Between floor and ceiling, the ways people live should remain as plural as possible.

Limits still impose real costs. Carbon caps, resource taxes, zoning rules, and other constraints remove some options. Democratic legitimacy does not require pretending otherwise. It requires that limits be explicit,

proportionate, revisable, tied to demonstrable effects, and paired with realistic alternatives.

Some conflicts will remain genuine. A rail line can damage local habitat while lowering transport emissions over time. Retrofit rules can impose real upfront costs on modest homeowners. Noise limits can restrict cultural activity.

A mature sufficiency politics has to acknowledge those losses instead of selling every policy as win-win.

It also helps to separate the decision about the limit from the decision about how to meet it. A society can agree on an emissions or land-use constraint while still choosing among standards, prices, quotas, infrastructure, targeted bans, or combinations of them.

That is where institutional pluralism begins. The same physical limit can be enforced through very different policy designs with very different effects on freedom and distribution.

Majority rule is not enough. A limit can burden a geographic, cultural, or occupational minority far more heavily than everyone else.

Credible institutions therefore need transparent criteria, appeals, periodic review, provisions for atypical cases, and explicit protection of essential needs.

The test is demanding but clear: a limit should address a real collective harm, be proportionate to that harm, preserve as much choice as possible over the means, and specify what happens to people who cannot comply without serious loss.

Mechanisms for appeal, justified exemptions, compensation, or adaptation are therefore substantive safeguards, not merely procedural ones.

The test is demanding: an ecological limit must be justified by a sufficiently robust collective impact, be proportionate, leave as much choice as possible over the means of compliance, and provide for what happens to people who cannot comply without severe loss. Sufficiency is not a general license to administer people's lives.

8. Wealth Without Endless Accumulation

A sufficiency policy is not successful just because a material indicator falls. It fails if essential needs remain unmet, if already-constrained groups lose autonomy, if freed-up time turns into invisible unpaid labor, or if environmental pressure is simply shifted to other places.

It also fails if meeting the target requires disproportionate surveillance of individual behavior. Privacy and autonomy are part of the capabilities the floor is supposed to protect.

And it fails if lower domestic flows are achieved only by outsourcing more production and damage abroad.

Another failure mode is hidden labor. A service that looks materially efficient because unpaid work has been pushed into households may simply be moving the cost off the books.

"Enough" can now be defined more precisely. It is not the point where desire ends. It is the point where society stops confusing more material means with automatically greater human possibility.

Enough is a relationship among three things: capabilities that should be guaranteed, the satisfiers available to provide them, and the physical constraints shared by everyone.

That relationship can change. If an innovation cuts the impact of a satisfier dramatically, more use may fit within the same ceiling. If a previously neglected pressure becomes critical, the boundary may need to tighten.

A sufficiency architecture therefore protects capability floors, improves the systems that convert resources into useful services, reduces positional races that no one can win collectively, and allows productivity gains to become time rather than always more volume.

It also leaves aspirations open. It does not require universal devotion to simplicity.

That is a crucial test. If the system works only when everyone becomes frugal, it depends on mass moral conversion. If it still works when people seek comfort, novelty, prestige, pleasure, and experimentation, sustainability has actually been institutionalized.

Sufficiency then becomes a property of social design rather than an obligatory personal virtue.

GDP can continue to move under such a system. Reconstruction after disaster can raise output while real wealth falls. Preventing disease can reduce medical spending while life improves. Monetary aggregates become outcomes to interpret, not goals to maximize.

The same is true of material consumption per person. A falling average can reflect better distribution or deeper deprivation. No aggregate should be read without its function and distribution.

A sufficiency economy does not minimize material use. It seeks the amount and composition of material use compatible with high capabilities, security, and sustainable ecological pressure.

That distinction matters because blind minimization could underinvest in care, adaptation, culture, or shared infrastructure. Sufficiency seeks functional adequacy under constraints, not a record for austerity.

The concept therefore has to be falsifiable. If lower material use consistently produces more poverty, worse health, less safety, or less autonomy even under reasonably designed institutions, the sufficiency claim has to be revised in that domain.

The reverse is true too. If equivalent services can be provided with fewer flows through better organization, maintaining the old level of throughput becomes harder to defend as necessity.

That symmetry keeps sufficiency from becoming an ideological password. Reduction is not good because it reduces. Expansion is not bad because it expands. Each move has to be judged by capability, physical pressure, distribution, and available alternatives.

The definition remains deliberately incomplete. It does not yet tell us how to redesign buildings, transportation, materials, production, repair, and reuse.

That is the next task. Once we know what should be made sufficient, we have to redesign the physical systems that provide it.

This definition remains deliberately incomplete. It does not yet tell us how to construct buildings, move people, organize materials, manufacture durably, repair, or close loops. It does not tell us which sectors must

shrink, which must expand, or how to prevent sufficiency from remaining a beautiful idea within an unchanged industrial metabolism.

That is precisely the next question. If we now understand more clearly what we want to make sufficient, we must transform the material systems that make it possible. The next chapter therefore leaves the definition of wealth and enters its infrastructure: how can we transform society's material metabolism without simply shifting costs elsewhere?

Methodological Notes and Limits of the Evidence

- Decent Living Standards energy thresholds are context-dependent orders of magnitude, not universal quotas.
- The 2026 result on income rank is associative; it supports a status mechanism without demonstrating that absolute income is causally irrelevant.
- Four-day-workweek trials show an organizational possibility, not proof that a national reduction in working hours would produce the same results across all sectors.
- Provisioning examples show that organization changes the resource intensity of services; they do not prove that any current country already satisfies all ecological limits.
- The chapter distinguishes a capability floor from a collective ceiling without yet specifying the corresponding policy instruments.

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CHAPTER 8 — Redesigning the Material Economy

The last chapter gave "enough" a positive meaning. A society can seek more health, mobility, time, knowledge, security, and cultural possibility without making ever-larger quantities of goods its universal measure of progress. But that principle remains abstract if buildings, vehicles, machines, networks, and products are still designed around ever-rising material throughput.

An economy is not just a stream of purchases. It is a vast physical stock—roads, homes, vehicles, power systems, machines, pipes, devices, data infrastructure—through which continuous flows of materials and energy pass.

That shift in perspective matters. A purchase is temporary; a physical stock creates obligations that last. A road built today requires resurfacing, drainage, bridge work, lighting, and maintenance equipment for decades. A building creates future demand for roofing, heating systems, wiring, windows, repairs, and renovation.

We therefore need to distinguish four flows: the net addition of new stocks; the replacement of retired elements; maintenance that preserves a function; and demolition that releases materials. Two territories using the same annual quantity of concrete can thus be in opposite situations: one is building its first sanitation network, while the other is prematurely replacing an already abundant stock.

This distinction immediately protects the justice principle from Chapter 6. Reductions in flows should target excess, underused, or oversized stocks first; they cannot prevent the construction of a material floor where it is still lacking.

Transforming society's material metabolism therefore means acting on three things at once: the quantity of stocks we actually need, the length of time they provide a service, and the quantity of virgin material that must be mobilized to maintain them. A circular economy becomes real only when these three dimensions actually reduce extraction and absolute impacts.

1. Start With the Stock, Not the Trash

Waste is visible because it appears at the end of the system. The larger material commitment often happened years earlier, when the stock was built. A city that keeps adding roads, parking, and commercial space creates decades of future maintenance demand even if construction waste is recycled well.

Research on socioeconomic metabolism shows that material stocks expanded rapidly with industrialization and continue growing across major world regions. As long as new buildings, infrastructure, and equipment are added faster than old stock is retired, end-of-life materials cannot supply all new demand.

Stocks also lock in geography. Infrastructure built for dispersed settlement can remain expensive to maintain even after population growth stops. A poorly located asset can become physically durable and economically stranded at the same time.

Saturation is therefore not a universal number of metric tons per person. It appears when adding more stock produces little additional capability relative to construction, operating, and maintenance costs.

A mature economy can then make material progress by changing the quality of the stock rather than increasing its mass: converting an empty office into housing, insulating a building, repurposing a road lane, or modernizing a network.

This temporal constraint changes the debate about circularity. Wealthy economies already possess immense stocks. They can rely more heavily on renovation, transformation, and selective replacement. Many less-equipped regions still need to build housing, water networks, hospitals, transportation, and energy infrastructure. Their need for primary materials therefore cannot be treated as a symptom of the same overconsumption.

European data give a sense of scale. The European Environment Agency estimates that in 2022 the European Union contained about 154 billion metric tons of material stocks, or nearly 344 metric tons per person. About 98.5% of this mass is found in buildings and infrastructure. Physically, then, our civilization is dominated not by phones or bottles but by roads, homes, bridges, networks, and structures built to last.

The EEA's 2026 report confirms that these orders of magnitude are not marginal: European material stocks nearly tripled per person between 1970 and 2022. Construction materials dominate so thoroughly that visible consumer goods occupy a physically secondary place.

This mass does not mean that small objects are ecologically negligible: they may contain rare metals, involve energy-intensive processes, or be replaced quickly. It simply reminds us that a material strategy that ignores buildings and infrastructure misses most of the tonnage.

The same report indicates that about 6.2 metric tons per person per year are mobilized to build, operate, and maintain European stocks. Stock is therefore never passive: its very existence structures future flows.

This figure aggregates several functions and should not be read as a fixed need. Part of it still accompanies expansion of some stocks, another part replacement, and another maintenance. Policy should precisely reduce the first where stocks are saturated while preserving the maintenance that prevents accelerated deterioration.

A sharp reduction in maintenance flows could create the illusion of material savings while merely accumulating degraded infrastructure and a larger future bill. Material sufficiency is therefore not the abandonment of physical capital.

More importantly, a mature economy does not escape material use when net construction slows. The European Environment Agency estimates that in 2022 about 41% of the European Union's total material consumption was used to expand and maintain stocks, a category that includes new construction, replacement, and renovation. Maintenance needs rise as stocks age. The problem therefore shifts: after the accumulation phase comes a phase in which preserving a large stock requires lasting inputs of materials, energy, and labor.

This inertia explains why land-use planning choices are so powerful. A highway, a dispersed housing development, or an enormous building does not create an impact only on the day it is built; for decades it generates demand for maintenance, mobility, and energy. Conversely, transforming an existing stock can avoid creating new material debt.

Infrastructure can thus create material debt without any explicit financial debt. The larger, more dispersed, or more complex it is, the more future materials society will have to devote to preventing its deterioration.

This debt is often invisible in initial decisions because budgets separate capital investment from maintenance. Construction can be politically visible; forty years of maintenance is far less so. Yet poorly maintained infrastructure loses its function more quickly and then requires heavier replacement.

A lean-stock strategy has to treat maintenance as investment. Repairing a road surface, roof, or machine early can use relatively little material and avoid far more expensive reconstruction later.

Preventive maintenance thus becomes a lever of sufficiency: it creates no new visible object, but extends existing capability with a smaller flow.

The cost also appears in flexibility. A single-purpose building is harder to repurpose than a structure designed with adaptable floor plates; a bonded component is harder to replace than a removable one. Future circularity is therefore decided when the stock is designed.

The right question is not "how much should each country recycle?" but "which stocks still need to grow, which can be stabilized, which should be transformed, and with what material flows?"

This framework distinguishes four situations. An under-equipped territory still needs to accumulate essential stock; an equipped but deteriorated territory primarily needs maintenance; an oversized territory can reduce or repurpose; a territory whose uses are changing needs to make its stocks flexible.

These situations require different flows. Building a water network requires new material. Renovating an existing network mainly requires maintenance and selective replacement. Converting vacant offices into housing reuses an existing structure. Deconstructing an unnecessary structure can finally release secondary materials.

Purely annual accounting does not always capture this difference. Two years involving ten million metric tons of materials can create opposite trajectories depending on what those tons become over the decades that follow.

Material metabolism therefore has to be tracked as a stock dynamic: what enters, how long it remains, what service it provides, and what future maintenance or replacement it commits us to.

2. Avoid Material Use Before Trying to Recycle It

Recycling is politically attractive because it seems to let consumption continue almost unchanged: keep producing, replacing, and discarding, then recover the material. That turns a question of volume into a question of processing technology.

But the material hierarchy starts earlier. The first kilogram saved is the product that never needed to be made. Next comes using less material for the same service, then extending useful life, increasing utilization, reusing components, repairing, refurbishing, and only after that recycling material.

Think of it as a decision tree. Does the service create enough capability to justify the material at all? If yes, can the same service be provided with less? Then ask about lifetime, sharing, reuse, repair, and recovery.

Take a concrete piece of equipment. Before buying a new machine, an organization can ask: is the service still necessary? is the existing fleet underused? can an existing machine be restored? can capacity be shared across several sites? can the product be leased or refurbished? Only then does the question of the material in new equipment arise.

This logic moves circularity from the waste department to the investment decision. The greatest benefit may come from an investment that never had to be made.

But avoidance is not always costless. Capacity that is unused today may be a strategic reserve for tomorrow. A hospital keeps surge beds; an electrical grid preserves margins; a city needs redundant spaces for crises. Material sufficiency must distinguish unnecessary underuse from resilience.

The opposite risk is permanent overcapacity justified by any imaginable contingency. The criterion must be explicit: what risk does the stock cover, with what probability, and is there a less material-intensive or more pooled form of reserve?

Sharing and reuse are not the same. Sharing increases the utilization rate of a single stock; reuse transfers an existing stock to a new user or a new use. In both cases, the benefit exists only if a new product or new infrastructure is actually avoided.

Sharing can also shift the quality requirement. An object used ten times more often wears out faster; it may therefore need to be designed to be more durable, repairable, and standardized. A sharing economy built on fragile objects may simply accelerate their destruction.

Conversely, a robust professional tool used by several people can replace a large quantity of rarely used household tools. The benefit then comes from combining better design with a higher utilization rate.

Sharing should therefore not be measured by the number of users registered on a platform, but by the number of private stocks actually avoided and the total service provided.

Repairing and refurbishing preserve more embodied value than recycling material, but they require parts, diagnostics, skills, and sometimes certification. Their superiority therefore depends on the cost of restoring the item and on the remaining service it can provide.

The IPCC estimates, for example, that in steel, strategies combining leaner design, longer service life, reuse, better building utilization, and high-quality recycling can substantially reduce demand. In construction, renovating an existing building can avoid considerable quantities of concrete and steel compared with demolition and reconstruction, provided that the building can actually deliver the expected service.

This hierarchy is not a religion. Avoiding necessary safety equipment would be absurd; extending the life of a dangerous object would be as well. It serves only to restore the order of questions: before asking how to recycle a product, ask whether it needed to be produced in that form, in that quantity, and with that service life.

The hierarchy can also be understood as conserving value. A new product already embodies extraction, transformation, transportation, assembly, and industrial capital. Crushing it immediately to recover its material destroys much of that embodied value. Repairing a part preserves more labor and structure; reusing a component preserves still more; avoiding unnecessary production preserves all the resources it would have mobilized.

Embodied value is not only energy or carbon. A machined part has a precise geometry; a module has interfaces; a building contains a structure, foundations, and permits. The farther one moves back toward raw material, the more of these levels of organization are destroyed.

Reusing a beam preserves the beam; remelting it preserves mainly the metal. Reusing a chassis preserves more than shredding its alloys. This hierarchy of preservation does not rule out recycling; it explains why recycling is often a last-resort strategy among circular options.

That is why high-value circularity is often harder than recycling. Reusing a beam requires information about its quality, dimensions, and history, plus a building designed for disassembly. Melting it as scrap is simpler but destroys its structural form. Serious circular policy has to begin at the design stage, long before material becomes waste.

It also requires information. To reuse a structural component, one needs to know its grade, past loads, corrosion, and sometimes its treatments. Without traceability, a technically reusable material may be legally or industrially unusable.

Material passports, disassembly standards, and repair documentation therefore have a simple function: preserve information along with matter. Circularity is as much an economy of industrial memory as an economy of waste.

3. Circular Loops Never Close Completely

In 2024, recycled materials supplied only a little over 12 percent of total material use in the European Union. That number does not mean the remaining material is simply waiting to be recycled. Growing stocks, long product lives, collection losses, contamination, quality limits, dissipation, and destructive uses all keep the loop open.

The EEA reports the circular material use rate at 12.2 percent. The indicator measures secondary materials as a share of total material use; it does not measure product lifespan, reuse, or absolute extraction.

Nor does the remaining 87.8 percent represent material that could all be recovered tomorrow. Much of the stock has not yet reached end of life, some material is dissipated, and recovered material does not always meet the quality requirements of the next use.

The metal in a beam can return in a new beam. Burned fuel does not return as fuel. Copper dispersed across millions of small devices is far more costly to recover than a steel rail. A composite plastic may theoretically be

collected but lose so much quality that it displaces only a small amount of virgin material.

The circularity rate is therefore a useful but incomplete indicator. It can rise because we recycle more; it can also rise because we use less primary material. The European Environment Agency emphasizes precisely this second lever: doubling circularity will not be achieved through recycling alone if total material use continues to grow.

The rule of this chapter is simple: a loop counts when it replaces a primary input. If one metric ton of recycled material is added to ten new metric tons that would have been produced anyway, the process has improved, but the metabolism has not yet been transformed.

We can formalize the substitution test: how many units of primary material would have been demanded without the loop, and how many are demanded afterward? The difference is the relevant gain. This calculation must be made at the scale of the market or system, not just the object.

The counterfactual is central. If a repaired object would have been kept anyway without professional repair, counting its entire extended lifespan as avoided production overstates the benefit. If, by contrast, a repair genuinely prevents an imminent new purchase, displacement is strong.

Secondhand businesses face the same problem. The number of transactions measures market activity, not the quantity of new production avoided. A platform can double its sales while simultaneously encouraging faster product turnover.

The right indicator is therefore close to a substitution elasticity: how does demand for new products change when the supply of repair, reuse, or rental increases? The answers vary with price, product type, fashion, physical lifespan, and symbolic value.

For some industrial goods, substitution can be nearly one-for-one: a refurbished pump replaces a new pump in the same installation. For consumer goods, market expansion and additional purchases make displacement far more uncertain.

This difference justifies sector-specific policies rather than a single reuse rate for the whole economy.

This rule detects windfall effects. A company can incorporate more recycled content while sharply increasing production; recycled content

rises, but primary demand can continue to grow. Process success is not yet metabolic success.

A second test must be added: the quality of the loop. Two metric tons of secondary material may not replace two metric tons of virgin material if they do not meet the same requirements. Copper, aluminum, steel, or polymers can be contaminated by alloys, additives, or mixtures. Industrial circularity therefore depends on sorting, traceability, standardization, and sometimes longer-term relationships between producers and users.

A high-quality loop keeps a material in a demanding application. A lower-quality loop may remain useful but displace less primary material. The term downcycling describes this loss of function without implying that recycling is useless.

Quality also has a temporal dimension. A secondary material may be technically available, but not at the moment industry needs it. Buildings constructed today will release much of their steel and copper several decades from now, while the energy transition may require those materials now.

This desynchronization explains why a gigantic stock does not automatically constitute an immediately exploitable urban mine. Part of it is still tied up in useful functions.

Another illusion has to be avoided: material already embedded in cities is not automatically available as a circular resource. It becomes available only when a product or building reaches the end of a use phase, or when conversion can release the material without destroying more service than it creates.

The timing of recycling is part of the physics of the loop.

Contamination is particularly important for alloys. Mixing grades can make a stream unsuitable for some applications even if its entire mass is recovered. Circularity therefore sometimes requires more separation at the source rather than spectacular sorting at the end of the chain.

This purity requirement explains why end-of-life sorting cannot repair everything. When incompatible materials are welded, bonded, or mixed during manufacturing, separation becomes costly or impossible. Design must anticipate the future quality of the secondary stream.

Conversely, excessive standardization can limit innovation and performance. The right compromise is to standardize the interfaces and information that facilitate reuse without freezing every technical solution.

The problem already appears in high-quality steel. The presence of contaminants such as copper can limit the use of some scrap in demanding applications. A circular economy therefore does not mean circulating any material whatsoever, but preserving enough of its quality for it to actually replace the targeted primary input.

This rate must be read with the same caution: it does not tell us what share of the economy has "closed its loops." A territory can improve collection and the use of secondary materials while sharply increasing total consumption. Relative circularity can improve while absolute extraction rises.

4. Reuse Only Counts When It Replaces New Production

Secondhand markets seem straightforward: if someone buys a used phone, one new phone should disappear. In practice, substitution is partial. The lower price may create a second-device purchase, while resale value can encourage the original owner to replace sooner.

The U.S. smartphone evidence makes the point clearly. The study estimates that a secondhand transaction extends total use time by about 40 percent but displaces only about 0.40 new devices on average. Under the observed scenario, with roughly one-quarter of consumers buying secondhand, production demand falls by about 15 percent and manufacturing emissions by about 14 percent.

The same study estimates that much wider circular adoption could cut manufacturing demand by roughly one-third. But shorter use periods erase nearly half of the theoretical benefit. Reuse helps only to the extent that it actually slows new production.

This result provides a general methodological rule, not a general coefficient: reuse must be measured by total service life and avoided new production.

The result matters because it is both encouraging and disappointing. Reuse works: fewer new devices are in fact manufactured. But it works far less than the intuitive assumption that one secondhand device equals one new

device avoided. Shorter ownership periods absorb almost half of the potential.

We therefore obtain a general criterion. Repair, refurbishment, and secondhand markets should be evaluated by a displacement rate: how much new production actually disappeared? A circular economy that multiplies circulating objects without reducing primary manufacturing may slow the flow, but it does not reverse it.

The smartphone also reveals an often overlooked temporal dimension. A secondhand market is effective only if the second life extends the device's total service time. If the first owner resells after one year instead of keeping the phone for three, then buys a new model, secondhand trade organizes a more sophisticated turnover without slowing production enough. The 2026 study estimates precisely that this effect cancels a substantial share of the potential benefit.

Three different lifetimes have to remain distinct: physical lifespan, time with the first owner, and total time in use across all owners. A resale market can shorten the first while extending the third.

For material use, the third matters most; for manufacturing, the total number of new devices produced remains the final test.

The same logic applies to cars, clothing, furniture, or professional equipment. A secondhand platform can be ecologically beneficial, neutral, or even stimulate some forms of consumption depending on what it replaces. The word reuse is therefore never evidence by itself. We must track the new product avoided, the additional use time, and the spending freed up elsewhere.

5. Keeping Something Longer Is Not Always Better

"The greenest product is the one you already own" is often good advice, but not a universal rule. For products such as smartphones, manufacturing accounts for much of the footprint, so longer use is usually beneficial. For equipment that consumes large amounts of energy year after year, operation may dominate instead.

An old furnace, air conditioner, or industrial machine can be repairable and still be so inefficient that keeping it indefinitely locks in large energy

use. The opposite mistake is replacing equipment that still performs well just to capture a small efficiency gain.

There is no universal replacement age. The relevant comparison is the manufacturing impact of the new equipment, the expected operating savings, the remaining life of the old equipment, end-of-life impacts, and the trajectory of the energy system.

This lifecycle logic prevents two symmetrical dogmas: obsolescence in the name of innovation and longevity in the name of circularity. In both cases, the question must remain: which system provides the service with the lowest total impacts?

The calculation becomes even subtler as the energy system decarbonizes. Replacing a highly electricity-intensive appliance today with a more efficient model will not yield the same benefit if the electricity it uses ten years from now is far less carbon-intensive. Conversely, keeping equipment that runs directly on oil or gas for a long time can lock in emissions that electrification would have avoided. The decision therefore also depends on the future trajectory, not only on present performance.

This is why ecodesign cannot be reduced to robustness. It must combine durability, repairability, modularity, efficiency in use, and upgradability. A computer whose processor, battery, or memory can be replaced preserves the material stock while allowing functional improvement. Modularity reduces the conflict between longevity and innovation.

6. Buildings: Use the Stock Before Replacing It

Buildings make the stock problem impossible to ignore. Homes, schools, offices, and hospitals contain enormous quantities of material and often last for generations. In places that are already heavily built, demolition and replacement accelerate stock turnover by design.

A material strategy should therefore ask first how existing space is used: vacant housing, underused offices, adaptable buildings, floor area per person, additions, conversion, and infill. Retrofits can then reduce energy demand while preserving embodied material.

That priority is not universal. Where safe housing, schools, hospitals, or basic infrastructure are missing, new construction serves a necessary social

function. Sufficiency means refusing automatic accumulation once the service is adequately provided—not freezing inadequate stocks in place.

Buildings deserve greater attention because they concentrate a mass incomparable to consumer goods. European stocks are dominated almost entirely by buildings and infrastructure. Choosing between renovation and reconstruction can therefore shift hundreds or thousands of metric tons of material on a single project.

The calculation must of course include operational energy. An extremely inefficient old building may sometimes justify a major transformation, or even replacement. But the embodied emissions of concrete and steel are released immediately during construction, while operational savings accumulate slowly. At a time when emissions reductions need to happen quickly, this timing matters as much as the total over fifty years.

The right principle is therefore not "never demolish," but to require demolition to prove its advantage over renovation by accounting for materials, embodied carbon, future performance, remaining service life, and urban function. Without such a test, it becomes too easy to destroy still-useful buildings in the name of the performance of the new.

7. Mobility: Reduce Mass While Expanding Access

Electric vehicles show why technology and sufficiency belong together. Electrification can sharply reduce use-phase emissions, especially on a cleaner grid. But an EV still contains large quantities of steel, aluminum, copper, glass, plastics, and battery materials, and still requires roads and parking.

Material demand from mobility can fall through several complementary changes: shorter distances, better transit and active mobility, higher occupancy, longer vehicle life, electrification of the remaining fleet, and lower vehicle mass.

The Ford/Magna Multi-Material Lightweight Vehicle project, supported by the U.S. Department of Energy, demonstrates the engineering potential. A benchmark five-seat sedan weighing 1,559 kilograms was redesigned to 1,195 kilograms—a 23.5 percent reduction in mass—while retaining a comparable vehicle function.

This result does not turn the private car into an ideal mobility system. It demonstrates a more general distinction: even when a service remains necessary, its mass is not a constant. Design can reduce material per unit of function. And when the mobility need itself can be met in other ways, the potential gain becomes even larger.

We must also distinguish individual lightweighting from the structure of the vehicle fleet. A car that is 20% lighter can represent technical progress while the fleet's average mass rises because vehicles are getting larger. The collective effect therefore depends on fleet composition, fleet size, and mileage, not only on the efficiency of a single model.

The same mechanism explains why the electric transition cannot be judged only by the number of electric vehicles sold. A smaller fleet of lighter vehicles that are used more collectively requires fewer batteries, less copper, less steel, and less space than replacing every internal-combustion car one-for-one with a heavy electric vehicle. Electrification remains essential for the remaining motorized travel; reducing vehicle mass and numbers reduces the material challenge of that electrification.

8. Use Less Material Before Decarbonizing What Remains

A sufficiency economy still needs heavy industry. Rail systems need steel, electrical grids need copper, infrastructure needs cement, and every long-lived stock eventually requires repair and replacement. The goal is not an economy without industry.

Heavy industry supplies the very materials required for collective systems—rail, electricity, water, housing, hospitals. A policy that simply cuts industrial output across the board could block the transition it is supposed to enable.

The crucial distinction is between necessary and avoidable demand. Necessary material demand may rise in some sectors and places. Avoidable demand should fall where stocks are already abundant and additional service is small.

Every metric ton avoided through lighter design, reuse, renovation, or component recovery is one less metric ton that has to be produced through a conventional blast furnace, an electric furnace, or a future hydrogen-based process.

That is why demand reduction and industrial decarbonization are complements, not substitutes. Using less steel does not eliminate the need to clean up steel production. Cleaner steel does not eliminate the value of needing less of it.

The two approaches hedge different risks. Material efficiency reduces demand for investment, electricity, hydrogen, and minerals. Industrial decarbonization lowers the impact of the material that remains necessary.

A robust strategy avoids betting everything on one technological curve. If hydrogen-based steel develops more slowly than expected, lower demand limits the shortfall. If cleaner production advances faster than expected, it creates more room for necessary material expansion where capabilities are still missing.

The hierarchy is not "technology or sufficiency." It is: avoid unnecessary functions, reduce material intensity in useful ones, extend and reuse what can be preserved, then decarbonize the residual production.

This openness to innovation must be preserved: the material hierarchy reduces the difficulty; it does not permanently fix the future level of every form of production.

In buildings, the IEA has also shown that extending service life, improving design, and reducing losses can substantially lower future demand for steel and cement. Material sufficiency therefore does not replace low-carbon processes; it reduces the scale on which they must be deployed.

It also reduces pressure on transition technologies. Decarbonizing growing material production requires more electricity, hydrogen, grids, and minerals. Reducing avoidable volumes makes the remaining industry easier to electrify or transform.

The principle is therefore not technology versus sufficiency. It is sufficiency, material efficiency, and technology applied in that logical order: eliminate unnecessary functions, lighten useful functions, then decarbonize what remains.

In steel and cement, this hierarchy can transform the scale of the problem. If we begin by decarbonizing demand that continues to grow, we must rapidly build more electricity, hydrogen, carbon capture, or furnaces. If we simultaneously reduce material needs through design, reuse, and longer

service life, the same low-carbon system can cover a larger share of residual demand.

Structural-reuse scenarios give a sense of the potential. A 2026 study of steel modules finds that a scenario prioritizing multiple reuse cycles sharply reduces embodied carbon compared with landfilling or a recycling-first strategy. This result depends on a specific building case, but it illustrates the value of preserving a material's form rather than only its chemical composition.

The study by Kosajan, Pan, and Zhang, published in 2026, compares several end-of-life cycles for a typical steel module in Hong Kong. The reuse-priority scenario produces a substantially lower embodied-carbon balance than landfilling and the scenario that prioritizes recycling.

Its scope should remain narrow: geometry, transportation, energy mix, number of cycles, and possibilities for recertification are specific to the case. It nevertheless shows that preserving structural form can have greater climate value than recovering the metal alone.

The industrial challenge is then less spectacular than the slogan "zero waste": compatible standards, standardized dimensions, material passports, design for disassembly, component markets, technical guarantees, and legal liability. Circularity becomes an organization of production chains, not merely a waste-treatment technology.

Designing for circularity means planning for disassembly, documenting materials, standardizing certain interfaces, maintaining access to parts, and assigning clear responsibility for components returned to circulation.

Circular design nevertheless involves trade-offs. A standardized part may be easier to replace but less optimized for mass. A removable fastening may require more material than an adhesive bond. A robust module may be slightly oversized so that it can survive several uses.

The comparison has to span several cycles. A design that uses 5 percent more material initially may still be better if it doubles service life or enables several rounds of reuse.

This logic explains why lifecycle assessments are necessary but insufficient if they assume an unrealistic number of reuse cycles. The actual frequency of cycles must be observed.

A material passport does not create the market either. It reduces an information barrier; buyers, guarantees, disassembly capacity, and compatible logistics costs are still required.

This design sometimes has an upfront cost: more removable fasteners, documentation, tolerance margins, or more robust materials. The benefit must be judged across several cycles, not only by the initial manufacturing cost.

Chapter 9 will address the economic rules that make these choices profitable; here, the material point is simply that a reuse market cannot emerge if objects are designed to become inseparable.

9. The Real Test: Is Virgin Material Use Falling?

Circular-economy policy can generate impressive-looking numbers—tons sorted, recycling rates, repair counts, secondhand transactions, recycled content. None of them proves by itself that primary material demand is falling.

A minimum dashboard needs separate measures: absolute primary inputs, actual product and building lifetimes, the share of new production genuinely displaced by reuse, lifecycle pressures, the quality of secondary materials, and the service delivered.

Those measures should be connected, not collapsed into one score. Falling primary input with collapsing service can mean deprivation. Longer life with sharply higher operating energy can be a bad extension. Higher recycling with higher virgin input can mean only relative circularity.

The stock itself also matters: material in buildings, infrastructure, vehicles, and equipment per person or per unit of service. But stock mass is only diagnostic; two stocks of equal weight can provide very different services and have very different distributions.

The purpose of the dashboard is to diagnose why flows rise or fall, not to assign a moral score to the economy.

Rate of change matters as much as direction. Primary material use can fall too slowly to meet an ecological constraint, while a fast transition can temporarily raise some flows because it is building infrastructure that later reduces them.

That means material policy needs trajectories, not snapshots.

Those trajectories must remain revisable. Better recycling technology may improve the quality of a secondary stream. A supposedly abundant material may become a bottleneck. New evidence can change the hierarchy without changing the central test.

The test stays symmetrical. A policy does not succeed because it uses the language of circularity. It has to demonstrate real substitution. And an innovation from a conventional industry should not be rejected if it genuinely reduces primary inputs, lifecycle impacts, and replacement needs.

Accounting boundaries matter too. Lower domestic use of virgin material can simply reflect greater imports of finished goods. Consumption-based material footprints are needed for the same reason consumption-based carbon footprints are.

The toughest question is also the simplest: are virgin-material demand and absolute lifecycle impacts falling while the relevant service is maintained or improved?

If yes, circularity is replacing part of the linear system. If not, it may be only an efficiency layer added to continued expansion.

That answer is conceptually simple and empirically difficult because substitution is a counterfactual: what would have been produced without repair or reuse?

A serious policy has to estimate that counterfactual using market data, purchasing surveys, stock models, or time-series evidence—and publish the uncertainty rather than pretending every repaired product equals one avoided new product.

Rebound can also erase part of the gain. A refurbished phone is beneficial if it delays or replaces a new one; much less so if it becomes an additional device. A lighter car saves material per vehicle, but not if total fleet size or average vehicle mass keeps rising. A retrofit saves energy, but growing floor area can absorb part of the benefit.

Circular rebound can take several forms: lower prices expand the market, rental increases utilization, easy resale accelerates first replacement, or unit savings are overwhelmed by more units.

None of that condemns reuse. It simply prevents theoretical savings from being booked before actual market behavior is observed.

Virgin material remains a central measure, but not the only one. A substitution can lower mass while increasing toxicity, water demand, energy use, or dependence on a critical mineral.

A robust test therefore combines several conditions: lower absolute primary inputs where stocks are already excessive, maintained or improved service, lower major lifecycle pressures, and no large transfer of harm to other places or populations.

That is what makes circularity falsifiable. If those conditions are not met, the label does not rescue the result.

The material metabolism of a post-growth economy can now be stated plainly: build essential stocks where they are missing; reduce primary inputs where stocks are already abundant; design products and buildings to last, repair, adapt, and circulate; make secondary materials actually replace virgin production; and progressively decarbonize the residual new production.

The goal is not "zero waste." It is a system that chooses useful stocks more carefully, uses them more intensively, maintains them intelligently, extends them when doing so makes sense, and preserves as much functional value as possible when they are taken apart.

New production never disappears entirely. Housing still has to be built, grids extended, worn equipment replaced, and unavoidable losses replenished.

That residual production should be supplied through the lowest-impact processes available. The realistic target is not zero extraction; it is primary demand reduced to a level compatible with necessary functions, regeneration limits, and acceptable impacts.

That success creates the next institutional problem. If products last longer, reuse expands, renovation replaces some new construction, and material throughput falls, what happens to jobs, income, firms, investment, and public revenue built around high turnover?

A manufacturer that sells half as many products because each lasts twice as long needs a different business model. A construction sector centered more on renovation than new building needs different skills and revenue

patterns. A smaller vehicle fleet changes the income streams tied to volume.

Chapter 9 takes up that problem: how to reward maintenance, repair, service, quality, and long-term investment without requiring permanent turnover of material volume.

The rational goal is not to promise zero extraction, but to reduce primary demand to a level compatible with necessary functions, regeneration rates, and acceptable impacts.

A major difficulty nevertheless remains. If products last longer, if sharing expands, if renovation replaces part of new construction, and if material flows decline, what happens to employment, income, businesses, investment, and public finances that still depend heavily on the turnover of volumes? The problem is no longer technical. It becomes institutional. That is precisely the function of the next chapter.

This difficulty follows directly from material success. If a manufacturer sells half as many products because they last twice as long, its business model must change. If renovation replaces part of new construction, employment and skills shift. If a smaller fleet provides the same service, revenues tied to volume may decline.

The institutional question follows directly: how can firms and public systems reward maintenance, repair, service, quality, and long-term investment without depending on constant turnover of material volume? Chapter 9 takes up that problem.

Methodological Notes and Limits of the Evidence

- The 0.40 substitution rate for smartphones is specific to the U.S. market studied; it serves as an empirical demonstration of imperfect displacement, not as a universal coefficient.
- The longevity/replacement rule is a lifecycle rule; no universal replacement age is proposed.
- The MMLV project is an industrial demonstration case; it establishes the possibility of lightweighting at comparable service, not the immediate generalizability of all material choices.
- European circularity rates measure the share of secondary materials in total material use; they are not a complete measure of sustainability.
- The chapter's success should be judged by absolute reductions in primary flows and impacts, not by recycling or reuse rates alone.

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CHAPTER 9 — Building the Institutions of a Post-Growth Economy

The physical direction is now clear: meet more needs with fewer material flows, keep products and infrastructure in use longer, expand some services, and shrink some forms of production. The harder question is institutional. Modern economies do not merely produce goods and services; many of their stabilizers quietly assume that output, income, markets, and asset values will keep rising.

When productivity rises, expanding output can absorb labor that would otherwise become redundant. Businesses often invest because they expect larger future markets. Rising tax revenue makes pensions and essential services easier to finance without forcing immediate fights over distribution. Rising asset values can make credit look safer. Growth, in other words, often works as a buffer between institutions and conflicts they would otherwise have to resolve directly.

That is why post-growth cannot mean declaring zero GDP growth and leaving the rest of the system alone. If employment, finance, public budgets, and investment have been built around expansion, removing expansion without redesigning those institutions can turn a slowdown into a crisis. The task is to identify what growth has been doing for the system and replace those functions deliberately.

A 2026 framework by Janischewski and colleagues sharpens this point. Claims about "growth dependence" have to specify four things: the system in question, what exactly is growing, how much growth counts as enough, and—most important—which function is threatened when growth disappears.

That level of precision rules out sweeping claims. A labor market may need output growth to preserve a given number of work hours under existing arrangements. A pension system may depend on wage growth or employment. Public finances may depend on nominal GDP or on the value of particular tax bases. Those are different mechanisms, and they require different solutions.

Dependence is also a matter of degree. Making employment less sensitive to weak growth does not make jobs immune to recession. Diversifying government revenue does not stop a crisis from reducing tax receipts. The goal is not immunity from economic shocks. It is a system that can absorb them without turning every slowdown into institutional failure.

A better test is not whether an economy can "have zero growth." Imagine instead that aggregate growth stays weak for years while some sectors contract and others expand rapidly. Can jobs, retirement income, public services, credit, and investment continue to function without setting off a chain reaction?

1. What Growth Used to Do—and What Must Replace It

Chapter 3 rejected the easy claim that capitalism, debt, or the welfare state mathematically requires endless growth. That caution still matters. A company can earn a profit without increasing sales. A government can collect taxes in a stagnant economy. Debt can be repaid by transferring existing income rather than creating new income.

Something can be mathematically possible and still be institutionally fragile. The more a system assumes higher future revenue, larger markets, or rising asset values, the more painful weak growth becomes. The practical question is not whether growth is logically required. It is which functions become unstable when growth slows, and what can make those functions less dependent on it.

There is no single post-growth policy. A workable system would have to coordinate employment, working time, investment, taxes, public services, retirement systems, finance, and business organization. The test is not how radical any individual proposal sounds. It is whether the pieces still work together.

An ordinary recession shows why preparation matters. When demand falls unexpectedly, businesses are left with excess capacity, layoffs follow, investment gets canceled, and firms scramble to protect cash flow. Tax revenue falls just as demands on public spending rise. Banks grow cautious, households postpone purchases, and pessimism feeds on itself. A deliberate post-growth transition is supposed to reverse that sequence: material throughput falls because institutions have already been redesigned so that

jobs, incomes, and investment do not depend on keeping the old expansion path alive.

The same GDP number can describe radically different societies: one with mass unemployment and crumbling infrastructure, another with shorter workweeks, functioning public services, and stable material stocks. GDP alone cannot tell those stories apart. What matters are the mechanisms that let a society live with weak aggregate growth without turning every slowdown into a social crisis.

An unplanned recession cuts demand before working hours, debt structures, public budgets, or investment plans can adjust. The unemployment that follows does not prove that a stable post-growth economy is impossible. It proves that an economy organized around expansion handles an abrupt loss of growth badly.

The reverse is just as important. Flat GDP is not automatically a post-growth success. If output stagnates because productivity collapses, investment freezes, and essential services deteriorate, nothing has been transformed; the economy has simply become weaker.

The redesign has to come first. Growth dependencies need to be reduced before ecological limits or economic shocks expose them through crisis.

2. Work: Sharing Productivity Without Creating Unemployment

If one hour of work can produce more and total output stops increasing, the arithmetic is immediate: fewer hours are needed. In an economy where income, social protection, and recognition are strongly tied to employment, this productivity gain can appear as a threat.

This arithmetic must nevertheless distinguish hourly productivity, productivity per worker, and sectoral productivity. A reduction in working time can increase hourly productivity by reducing fatigue, without that effect being enough to offset all the hours removed. In presence-based services, measured productivity may change very little.

We must also distinguish the stock of employment from the flow of hiring. A company can reduce hours without laying anyone off but stop hiring; at the macroeconomic level, this gradually changes the distribution of jobs rather than instantly sharing every position.

Working-time policy has to be coordinated with demographics, skill shortages, and sectoral needs. An aging population may make a uniform reduction in hours undesirable in care work while allowing it elsewhere.

The most intuitive post-growth response is work sharing. A shorter workweek converts part of the productivity gain into time rather than volume. Chapter 7 showed that this time can improve well-being when it is genuinely autonomous. But macroeconomics adds an objection: a company cannot simply reduce hours without effects on its costs, profits, prices, and investment decisions.

Work sharing can take several forms: a shorter workweek, additional leave, phased retirement, time accounts, compensating hires, or negotiated reductions in overtime. These instruments do not have the same effects on wages, productivity, recruitment, and organization.

A uniform statutory reduction has the advantage of simplicity but may be poorly suited to continuous-service sectors. Sectoral or company-level bargaining is more flexible but can reproduce existing power imbalances and leave some workers unprotected.

The aim is not to maximize free time for its own sake. It is to keep productivity gains from turning mechanically into unemployment or excess production when material output needs to stabilize.

Basil Oberholzer's model shows precisely that an isolated reduction in working time can destabilize an economy in which minimum profitability conditions private-sector activity. To maintain employment and stability, it must be accompanied by public investment and macroeconomic governance capable of supporting demand and preserving viable private activity.

The model's contribution is to make the profit constraint visible. If companies see their margins compressed by a poorly financed reduction in hours, they may cut investment or employment. A time policy that ignores the income statement can therefore shift the problem instead of solving it.

Several channels are possible: higher hourly productivity, margin moderation, proportional wage reductions at high incomes, targeted tax compensation, or reorganization of capital. None is costless, and none should be presented as a universal solution.

The distributive question is unavoidable: who bears the cost of converting productivity gains into time—the worker, the employer, consumers through prices, taxpayers, or some combination?

So the policy is not simply "work less." It is to convert part of productivity growth into time while protecting the incomes, services, and investment that make the arrangement viable. Work sharing becomes a stabilizer only when it is part of a larger institutional package.

Consider a simple example. A company with one hundred employees increases its productivity by 2% per year. If sales remain stable, with unchanged organization it can produce the same amount with roughly two fewer full-time equivalents. In a growth logic, it seeks new markets to maintain or increase employment. In a sharing logic, it can gradually reduce average working time. But this operation becomes socially beneficial only if hourly wages, contributions, workloads, and staffing requirements are reorganized. Otherwise, the productivity gain simply becomes work intensification or lower income.

Sectoral differences complicate the equation further. Cutting working time by 10% in an IT consulting firm does not have the same effect as in a hospital where care must be provided twenty-four hours a day. In services with low measurable productivity, a shorter workweek may require more hiring and therefore more funding. This is not an argument against reducing working time; it is why such a policy must be coupled with training, recruitment, wage, and public-funding policies. Post-growth does not eliminate either labor shortages or the constraint of human presence.

This heterogeneity requires distinguishing sectors where labor is a cost to be reduced from those where labor is part of the service itself. In an automated factory, higher productivity may allow fewer hours for the same volume. In a childcare center or care facility, reducing hours of human presence per user can directly degrade quality.

Employment policy cannot impose one working-time target on every sector. It has to help labor move from contracting activities into sectors that need to grow. That means training, occupational mobility, recognition of qualifications, and sometimes higher pay in shortage occupations.

Frictional unemployment and retraining delays then become real transition costs. A credible architecture must budget for them instead of assuming that a job lost in the automobile industry instantly becomes a job in building renovation.

Working time can also serve as a cyclical shock absorber. Temporarily reducing hours rather than laying people off preserves skills when demand falls. But a permanent, organized reduction serves a different function: durably sharing productivity that can no longer be absorbed by expanding volumes.

There is also a distributional problem. Cutting paid hours does little for someone whose wage is already too low, while the same reduction may be a major quality-of-life gain for a highly paid manager. A workable policy therefore needs income floors, progressivity, and attention to unpaid domestic labor. What is being shared is not only employment, but access to adequate income and genuinely free time.

3. Can Businesses Stay Profitable Without Growing?

A stable company does not have to be a profitless company. If sales cover wages, inputs, maintenance, taxes, investment, and returns to capital, the firm can earn a surplus without becoming larger the next year. The pressure begins when profitability is judged inadequate unless the company's value and earnings are expected to keep rising.

Profit serves several functions: a buffer against shocks, financing investment, compensation for risk, and income for owners. A company that does not grow may still need each of these. What changes is how the surplus is used and the pressure to systematically reinvest it in increasing volume.

A mature company can distribute more earnings, raise wages, reduce hours, strengthen its equity position, improve quality, or finance innovations that lower its physical costs. None of these options requires sales to increase indefinitely.

But a publicly traded firm whose valuation rests on expected profit growth faces a different difficulty. Even if it remains profitable, it can be penalized if the market expects permanent expansion. The dependence then lies in valuation conventions and financial governance, not in profit accounting itself.

A recent study of thirty-five North American companies oriented toward post-growth shows that this logic is not merely theoretical. Thirty-three are conventional privately held firms. None says it wants to grow indefinitely; several seek a size they consider appropriate and then prefer to improve their practices, collaborate with other actors, or spread their model rather than continually increase their own volume.

The Shourkaei–Dyck study, verified in 2025, does indeed cover 35 firms, including 33 private companies and two cooperatives. The authors identify several ways to increase social or ecological impact without pursuing maximum organizational size: spreading practices, partnerships, institutional influence, or replication.

This result opens a useful distinction between scaling the organization and scaling a function. A company can remain small while spreading a technology, standard, or method; conversely, a company may need to grow rapidly because its product replaces a highly damaging activity.

The post-growth test is not a mechanical version of "small is beautiful." It asks whether expansion adds useful capacity and displaces a greater harm, or whether growth has become a financial objective in its own right.

The evidence remains modest. The sample consists almost entirely of small, self-selected companies. We cannot infer from it that a steel mill, a publicly traded bank, or a global digital platform would operate in the same way. But the case at least disproves one overly strong claim: private ownership does not force every individual company to pursue infinite growth.

Capital-intensive businesses remain the harder case. A steel mill, telecom operator, or railroad has to finance large assets before revenue arrives. Stability depends not only on sales, but on predictable demand, financing costs, and the time it takes for investment to pay back.

A high-fixed-cost company can be profitable at stable volume if prices cover costs and debt is compatible with that volume. But a rapid fall in demand can create much larger losses than in a capital-light activity. Sectoral contraction therefore becomes a problem of deleveraging, conversion, and sometimes orderly closure.

This difficulty prevents us from generalizing from the experience of small post-growth firms. On the contrary, it justifies preserving them as evidence

that a form of entrepreneurial behavior is possible, not as a universal model.

The deeper issue is institutional. Stabilizing firm size becomes harder when financing depends heavily on debt, investors demand high returns, competition rewards scale, and executive compensation tracks valuation. A post-growth economy would therefore need a wider mix of financing and governance: patient capital, cooperatives where they fit, stable privately held firms, public finance, long-term contracts, and rules that reward durability rather than churn.

American small-business data make the financing constraint concrete. The Federal Reserve's 2026 Small Business Credit Survey, based on 6,525 employer firms, found that only 42% of applicants received all the financing they sought; 22% received none. One-third of firms reported debt payments or interest rates as a financial challenge, and 29% cited credit availability. Financing conditions are not an abstract detail of business behavior—they shape what firms can actually do.

A transition policy cannot assume that firms will transform simply because a rule tells them to. If replacing equipment or changing a production process requires substantial capital, interest rates, loan terms, guarantees, and cash flow can determine whether the investment happens at all.

Conversely, subsidizing every "green" investment without testing its social return can preserve unnecessary capacity. Finance must follow the necessary transformation, not recreate a race for capital under a new label.

None of this means firms should be prevented from growing. A useful technology may need to spread quickly, and a young company may need to reach an efficient scale. The rule is narrower: expansion should serve a function rather than become a permanent obligation.

4. Invest to Renew and Transform, Not Just to Expand

The term post-growth sometimes evokes an economy without investment. The opposite is true. The transition described in Chapter 8 requires immense transformations: building renovation, electrical grids, public transportation, climate adaptation, ecosystem restoration, research, and renewal of existing capital.

A post-growth transition may even temporarily involve a high investment rate. Building electrical grids, renovating buildings, adapting cities, and transforming industry require mobilizing resources today in order to reduce future costs and pressures.

The key distinction is what investment does: replace worn-out capital, transform an existing system, adapt to new conditions, or add net capacity. Two economies can devote the same share of income to investment and produce very different physical outcomes.

Chapter 8 provides the material compass here: an investment is more coherent to the extent that it reduces future flow requirements or protects an essential service with less pressure.

What declines is not investment in general, but net investment aimed at endlessly expanding material stocks in sectors that are already saturated. An economy whose stocks stabilize still replaces infrastructure as it reaches the end of its service life. Industry can thus gradually shift from a logic of expansion to one of renewal and transformation.

That shift changes the return problem. An energy retrofit, a rail line, or a hospital may produce large social gains while offering a lower private return than investors demand. Public finance, guarantees, development banks, and procurement can help align investment with those wider returns.

They do not eliminate capital scarcity. Directing resources toward a rail network means not directing them elsewhere. Post-growth makes these trade-offs more explicit because it no longer assumes that future expansion will allow everything to be financed simultaneously.

Scarcity becomes harder to hide when future growth is no longer expected to enlarge every budget. Building an electrical grid, renovating buildings, and expanding health capacity at the same time all draw on skilled labor, materials, industrial capacity, and savings.

A guarantee or public loan can shift financial risk. It cannot create an electrician, a metric ton of copper, or an hour of work. Investment policy has to be tied to real productive capacity or it risks turning physical scarcity into inflation.

That gap between money and real capacity matters in a rapid transition: a legislature can approve a budget long before the supply chain or skilled workforce exists.

This distinction between net investment and replacement investment is essential. Imagine a housing stock that is large enough. Even if the number of homes stops increasing, roofs, boilers, windows, elevators, and networks continue to age. A stable economy can therefore sustain substantial construction and engineering activity through renovation, maintenance, and conversion without increasing the total stock of floor area. Likewise, a stabilized rail network requires maintenance, signaling, rolling stock, and modernization for decades.

This can be expressed as stock accounting. Gross investment = replacement of worn-out capital + net investment. In an economy where some material stocks stop growing, gross investment does not fall to zero: it can remain high if maintenance, renovation, and transformation are substantial.

This is why post-growth must not be confused with disinvestment. A society that lets bridges, housing, or hospitals decay is not practicing sufficiency; it is consuming its existing capital.

The opposite mistake is to call every project "necessary." Oversized or redundant infrastructure creates decades of maintenance obligations. The test has to include the full lifetime cost of the stock being built.

Some sectors, meanwhile, have to expand: heat pumps, electrical grids, energy retrofits, public transportation, and perhaps some low-carbon materials. Post-growth does not tell every sector to stand still. It asks whether growth in necessary capacity is matched by contraction or stabilization elsewhere so that overall material pressure actually falls.

Discount rates and expected returns become politically important here. A retrofit that saves energy for thirty years may be socially valuable and still look unattractive to an investor who needs a quick payback. Public guarantees, long-term loans, and development banks cannot create value for free, but they can finance benefits that private revenue streams capture poorly. The same discipline applies in reverse: projects whose social benefits no longer justify their cost should be abandoned.

The discount rate expresses a preference over time and risk. The higher it is, the less distant benefits count in current decisions. Prevention,

renovation, or adaptation projects can therefore be disadvantaged even when they avoid substantial costs over several decades.

A lower discount rate does not make scarcity disappear. It gives more weight to future benefits and can also lock capital into projects that prove inflexible. Public institutions should make their assumptions about time, risk, and benefits explicit rather than bury the trade-off in a single number.

Public banks and guarantees can correct excessively short private time horizons, but they can also socialize losses. Their failure test has to be explicit: sustained support for assets whose social value or future savings do not justify their cost.

5. Debt and Credit Without a Growth Myth

One recurring claim says compound interest makes growth mandatory: because borrowers repay more than they receive, the economy must continually create more money and more output. That argument confuses an individual contract with the system as a whole. Interest paid by one borrower becomes income to someone else; the existence of interest does not mathematically require GDP to rise.

Money, income, and production are different things. A bank can create a deposit when it extends a loan; interest is then paid from income already circulating through the economy. No accounting identity requires every dollar of interest to be matched by an additional dollar of GDP.

A highly indebted system can, however, become dependent on nominal income growth. If many contracts were signed on the assumption that wages, rents, or sales would rise, unexpected stagnation mechanically increases the real burden of payments.

The distinction that matters is between mathematical necessity and institutional fragility.

Finance can still become highly dependent on growth. Debt written on the assumption of rising profits becomes dangerous when income stalls. Banks whose assets depend on ever-rising real-estate or stock prices become fragile when those prices stop climbing. The vulnerability lies in balance sheets and expectations, not in a universal equation.

Ecological stock-flow models are useful precisely because they force us to track the claims and liabilities of each sector. They show that a post-growth economy must pay closer attention to leverage, maturities, asset prices, and the destination of credit.

Their advantage is that they rule out income without a corresponding financial counterpart. If one sector accumulates an asset, another carries the liability or provides the financing; if the government spends more, that spending becomes income for other agents. Accounting identities do not, however, guarantee that behavior is plausible.

Internal consistency is only a floor. A model can balance every account and still underestimate bankruptcies, political reactions, expectations, or physical bottlenecks.

That warning matters especially in post-growth modeling, where a coherent simulation can too easily be mistaken for proof that the real economy will behave the same way.

The goal is not to eliminate debt. It is to reduce dependence on perpetual asset appreciation and direct more credit toward transformations backed by credible repayment flows. Some debts may need restructuring or tighter limits; others remain useful precisely because they move resources across time.

Transition debt can be sustainable if it finances an asset or a credible future saving: a renovation that lowers an energy bill, a network that provides a durable service, or equipment that raises productivity. Debt used to permanently support spending without an income base poses a different problem.

But even the first kind can fail: construction costs, interest rates, or benefits below expectations can make repayment difficult. The word investment does not protect against risk.

A prudent system would watch debt-to-income ratios, maturities, fixed versus variable rates, concentration of claims, and the quality of collateral.

A simple example shows why growth nevertheless makes debt easier to carry. A household or company with fixed-rate debt can service its payments more easily if nominal income rises. At the public level, debt can likewise become lighter relative to national income if the denominator grows. Under weak growth, this relative erosion is smaller: the initial debt

structure therefore matters more, and leverage mistakes are less easily absorbed over time.

Housing makes the danger easy to see. When banks and households assume property values will rise indefinitely, credit can lean on the future value of collateral. Once appreciation stops, a highly leveraged system discovers that its apparent safety rested on capital gains rather than on borrowers' ability to repay. A post-growth financial system would have to rely more on repayment capacity and less on expected appreciation.

Housing illustrates the link between credit and asset-price growth. If financing relies primarily on rising asset prices rather than on the income that pays for use of the asset, the system becomes sensitive to the end of capital gains.

That suggests putting more weight on repayment capacity and less on speculative collateral gains. But the trade-off is real: standards that are too strict can shut younger households out of housing or slow necessary renovation.

The choice is between resilience and access to credit, not between morally "good" and "bad" debt.

Tighter credit can itself do damage by blocking renovation, entrepreneurship, or housing access. The goal is not a risk-free economy. It is a system in which risk finances productive transformation more often than the inflation of existing assets. The functional question is simple: what future cash flow will actually repay the loan?

Credit policy also has to distinguish new borrowing from refinancing. A viable firm can become insolvent because debt comes due just as rates jump. In a low-growth economy, maturity structure can matter as much as the total amount owed.

Longer maturities or fixed rates can increase the resilience of some transition investments, but they shift risk toward lenders. A bank holding many long-term fixed-rate loans can become vulnerable if its own funding costs rise.

There is no risk-free balance-sheet structure. Stability comes from making risk explicit and holding enough equity to absorb mistakes.

6. Pensions and Public Services: The Trade-Offs Don't Disappear

Retirement systems are one of the hardest political tests because they strip away financial magic. Retirees consume housing, food, energy, health care, and human labor produced in the present. Whether benefits are financed mainly from current contributions or from accumulated assets, those real resources still have to exist.

The physical constraint is simple: retirees consume a share of current production. Financial claims determine who is entitled to that share; they do not themselves create nursing hours, food, electricity, or housing.

Aging therefore changes the composition of demand. The political question is how much labor and how many resources go to retirees while preserving the capabilities of workers, children, and other groups.

High financial returns cannot solve that problem if future production cannot supply the goods and services those claims are supposed to buy.

In a system financed largely from current workers' contributions, balance depends on employment, wages, productivity, contribution rates, retirement patterns, and benefit rules. Weak growth makes the trade-off more visible because the pool of income expands more slowly. With an aging population, all of those variables cannot stay fixed forever.

That does not translate into a single answer such as "work longer." A society can raise employment among older workers, change taxes or contribution rates, make benefits more progressive, share productivity gains differently, or adjust retirement rules. Every option places costs on different groups, and a credible system has to say who bears them.

Employment among older adults is also distinct from the formal retirement age. Better health, less involuntary early exit, flexible work, and gradual retirement can increase the number of contributors without imposing the same extension of working life on everyone.

A single rule can also hide unequal burdens. Automatically tying retirement age to average life expectancy may look fiscally tidy while ignoring large differences in health and job strain across occupations and income groups.

A durable system therefore needs general rules plus explicit corrections—not exceptions buried in opaque formulas.

Funded retirement accounts diversify financing, but they do not manufacture future goods and services. They add financial claims and expose retirement income to market returns. A large shift from current-pay financing to funding also creates a transition problem: current retirees still have to be supported while working households build assets for their own retirement.

The realistic goal is not a retirement system "independent of growth." It is one whose rules remain workable under cautious assumptions about productivity and income growth, with adjustments that are explicit, predictable, and distributively visible.

For an American reader, Social Security makes the arithmetic concrete. The 2026 Trustees Report projects that program costs will exceed total income in 2026 and remain above income throughout the rest of the 75-year projection period.

Under the Trustees' intermediate assumptions, the combined OASI and DI reserves are projected to cover full scheduled benefits through 2034. If Congress made no changes, continuing program income at that point would cover about 83% of scheduled benefits. That is not a prediction that lawmakers will do nothing; it is a way of making the financing constraint visible.

The old-age program alone reaches the constraint sooner: OASI reserves are projected to be depleted in 2032, with continuing income sufficient for about 78% of scheduled benefits at that point. The timing differs because the program's rules, revenues, demographics, and benefit structure matter —not demographics alone.

The Trustees also publish low-cost, high-cost, and stochastic alternatives rather than pretending that one projection is certain. That is exactly the discipline a post-growth retirement system would need: make assumptions visible, show how outcomes change when those assumptions move, and define in advance what would require adjustment.

Financial sustainability and intergenerational fairness are still separate questions. A reform can close a gap by placing more of the adjustment on current workers, beneficiaries, taxpayers, or future cohorts. Solving the accounting problem does not tell us which distribution is just.

Social Security is not a post-growth model, and it should not be presented as one. Its value here is narrower: it shows, in a familiar American

institution, that retirement promises depend on explicit demographic and economic assumptions and that delay does not make the trade-off disappear.

Automatic rules can make adjustment more predictable, but they cannot make distribution disappear. Changing benefit indexation, taxes, contribution rates, or claiming ages still decides who absorbs the shock.

Predictability is useful; neutrality is impossible. A robust institution should make adjustment rules understandable and foreseeable without hiding distributive choices behind technical formulas.

7. How to Fund the State When the Tax Base Is Supposed to Shrink

Public finance faces a simple contradiction. A successful carbon tax reduces carbon use and eventually erodes its own revenue base. The same is true of a tax on extraction or any other activity the policy is designed to suppress. Financing a permanent service with a harm we hope to eliminate creates a built-in dependency on failure.

Corrective taxes are useful precisely because they can shrink the activity being taxed. That makes them powerful policy tools and unreliable permanent funding sources for services whose costs may keep rising.

The budget therefore needs two different categories. Temporary or declining revenues can fund transition investments and compensation; permanent functions need tax bases durable enough to outlast the transition.

That separation also improves democratic clarity. The state should not become fiscally dependent on the pollution, extraction, or behavior it says it wants to reduce.

A post-growth tax system would distinguish steering taxes from durable revenue. The first raise the cost of behavior society wants to reduce. The second finance long-term services through bases such as income, residual consumption, land value, wealth, rents, or profits—depending on political choices about distribution.

Recent simulations of wealth taxation show that there is no single optimal tax for every purpose. A wealth tax can be highly progressive; a tax targeted

at certain assets may capture rents more effectively; effects on investment and behavior differ.

Wealth, land, rents, and profits have different tax bases and different forms of avoidance. Taxing them does not have the same effects on investment, household liquidity, or capital mobility.

Wealth taxation can correct concentration or finance part of the system, but its revenue depends on valuations, exemptions, and administrative capacity. By definition, it is no more "independent of growth" than any other tax.

One rule is enough: match the tax base to the function—behavioral steering, redistribution, or permanent financing—and test whether the revenue remains stable under the very transition the tax is meant to support.

Growth cannot be replaced with a "magic tax." A durable fiscal system needs several transparent revenue sources that can continue financing public functions even as some material tax bases contract.

Revenue is only half the problem; the cost of services matters too. Health care, education, and care work rely heavily on human labor, and measured productivity in those fields often rises more slowly than in manufacturing. If wages still track the broader economy, their relative cost rises—the classic Baumol effect. A post-growth economy has to decide how much of its resources it wants to devote to these services rather than assume another tax increase will always close the gap.

Baumol's point matters especially here. If manufacturing productivity rises faster than productivity in care or education, keeping wages competitive makes time-intensive services relatively more expensive.

That is not automatically a sign of economic failure. It may mean society is choosing to devote more of its total productivity to care and education. Trouble begins when revenue does not keep pace or when the workers providing those services remain underpaid.

A sector can become more expensive relative to the rest of the economy without becoming less valuable.

Prevention, useful digital tools, pooling, and better organization can reduce some of the pressure, but they cannot eliminate it. Caring for an older adult, teaching a child, or supporting a person with a disability takes

human time. A society can rationally devote a larger share of its income to those activities without treating that shift as inefficiency. Public finance should be judged by the services it secures, not only by its share of GDP.

Care also exposes a labor constraint. An aging society may need more hours of care while trying to reduce average working time. Those goals fit together only if other sectors release workers, organization improves, or more people enter care occupations.

A program cannot promise fewer working hours for everyone and much more labor-intensive care without explaining where those hours will come from. A coherent post-growth economy has to budget time as well as money.

That does not mean maximizing employment. It means recognizing human time as a scarce resource that must be divided among paid production, care, family, rest, and civic participation.

Timing matters for the public budget as well. A transition may require heavy investment just as fossil-related revenues begin to fall. Borrowing can make sense when it creates durable assets or lowers future costs. It becomes harder to defend when it permanently finances spending with no durable revenue base. With weak growth, mistakes are also less likely to be diluted by a rapidly expanding denominator.

That sequence can create a financing hump: large upfront investment, declining environmental revenue later, and operating savings only after that. A fiscal rule written for a single year can badly misread the transition.

But "transition" can also become an excuse for permanent deficits. Public borrowing should be tied to a time horizon, an asset, a credible future saving, or a durable revenue stream.

The standard is not "public debt is good." It is whether the financing makes sense across time.

8. The Package Has to Work as a System

Transition plans often present each measure in isolation at its most attractive. Shorter hours can support employment. Wealth taxes can reduce inequality. Public investment can accelerate infrastructure change. Redistribution can protect households. Once these policies operate

together, however, they also change wages, profits, prices, tax revenue, saving, consumption, and debt.

The package has to be read as a stock-flow system. Fewer hours change the wage bill; taxes change prices and revenue; public investment changes debt and productive capacity; sectoral contraction changes profits and jobs; redistribution changes consumption.

The public budget has the same feedback loops. Fewer paid hours can reduce payroll-tax or social-insurance revenue; other taxes may compensate but change consumption; public investment can support employment while temporarily increasing imports and debt. Each loop has to be followed through to its plausible final effect.

The whole package also has to survive stress tests: higher interest rates, lower productivity, a more expensive energy transition, faster aging, or tax revenue below forecast. An architecture that works only in its central scenario is not robust.

That is where scenario discovery and sensitivity analysis are more useful than a single point forecast. They show which combinations remain workable across several futures and which assumptions are doing most of the work.

If the effects are modeled separately, the same dollar can be spent implicitly more than once. This is the institutional version of the double counting discussed in Chapter 6.

A credible architecture therefore has to put resources, uses, and expected reactions into the same frame.

Recent post-growth macroeconomic models are beginning precisely to explore these interactions. EUROGREEN simulates scenarios combining material efficiency, reduced working time, a job guarantee, wealth taxation, and lower consumption. A 2026 study based on this model shows that policies reducing emissions and those reducing inequality overlap only partially: achieving both requires coordinated combinations.

Van Eynde and colleagues proposed minimum criteria for such models in 2026: they must explicitly represent the dimensions necessary to the post-growth question rather than simply impose a GDP trajectory. This requirement strengthens the discipline of comparison.

EUROGREEN adds interactions among economic structure, employment, distribution, and the environment. Its 2026 circular-economy extension introduces raw materials, waste, and recycling, bringing the model closer to Chapter 8.

COMPASS explores other trade-offs and, in work by Dallinger et al. posted online in 2026, calculates an ISEW in response to a carbon tax, redistribution, and reduced working time. This text is an arXiv preprint revised in May 2026: it is used here to test the coherence and interactions of a scenario, with a lower evidentiary status than a peer-reviewed publication.

Campigotto et al. use scenario discovery to identify combinations compatible with both lower emissions and reduced inequality. As of August 13, 2026, the article is available online but assigned to volume 250 of Ecological Economics dated December 2026; it is therefore cited here as an online / forthcoming article, not as an issue already published.

COMPASS reaches a similar lesson. The effects of a carbon tax, redistribution, or reduced working time do not add up mechanically. A policy can improve one indicator and worsen another; their combination can change the trajectory.

These simulations are not forecasts. They depend on parameters, behavioral assumptions, and simplified structures. Their value is more modest and more useful: they force a program to show that its promises fit together. If it promises less work, more income, more investment, lower material use, and stable public finances, it has to identify the flows that finance each piece.

They are useful in three ways: checking accounting identities, exposing conflicts or side effects among goals, and identifying which assumptions make the results change.

Their limitation is the mirror image of their strength. Behavior, politics, and future innovation are simplified. A model can show that a scenario is coherent under a set of assumptions; it cannot show that citizens, banks, firms, and governments will actually produce that scenario.

That is where Chapter 10 begins—where equations give way to consent, conflict, rights, coalition-building, and correction.

The Canadian stock-flow consistent model developed by Jackson and Victor provides a good illustration of this discipline. Over several decades, it tracks relationships among households, businesses, government, and finance across three trajectories, including a sustainable-prosperity scenario combining environmental, social, and financial policies. The value of the model is not to announce Canada in 2067, but to verify that a low-growth scenario can be described without violating the accounting identities linking debt, saving, investment, and income.

EUROGREEN pushes the exercise toward interactions between circularity and social institutions. Reduced working time, a job guarantee, redistribution, and material efficiency can reinforce one another on some objectives and conflict on others. Lower material consumption can relieve ecological pressures but reduce some market incomes; a job guarantee can support demand but require more public funding; a wealth tax can improve distribution but alter saving and investment.

That is why a political program cannot be written as a list of ten attractive measures. Every instrument creates a new pattern of income and costs. For each promise, the discipline is to ask: who pays? who receives? what behavior changes? what side effect appears? and what institution can address that effect without recreating the problem somewhere else?

A package must also be sequenced over time. Investing in alternatives before heavily taxing a dependency can reduce the political cost; securing incomes before a sectoral contraction can prevent a recessionary spiral; adapting financial rules before a rapid decline in carbon-intensive assets can reduce bankruptcies.

Reverse the order and the same policies on paper can produce a different outcome. Institutional design therefore includes a sequence, not just a list.

This timing must remain revisable: a transition that proceeds faster than expected may allow some support measures to be withdrawn; a crisis may require slowing a contraction without abandoning the material objective.

A post-growth architecture has a clear failure test. It fails if ecological gains come with persistent unemployment; if jobs are protected through uncontrolled inflation or debt; if public services survive by shifting the entire cost onto one generation; or if businesses become unable to maintain and replace useful capital.

We can also add robustness indicators: persistent unemployment, underinvestment in maintenance, cascading bankruptcies, uncontrolled growth in nonperforming loans, energy poverty, deteriorating services, a structural deficit without a funding base, or persistent dependence on revenues that the transition is supposed to eliminate.

These indicators should not be collapsed into a single score. A system can succeed on employment and fail on debt, or succeed ecologically and fail distributively. The tensions need to remain visible.

Institutional success means being able to absorb a low-growth period without sacrificing the human capabilities identified in Chapter 4 or violating the physical constraints developed in Chapters 5 and 8.

It can also fail in subtler ways: by reducing GDP while leaving rents intact; by socializing the losses of declining sectors while privatizing the gains of new sectors; by imposing ecological caps without material alternatives; or by turning sufficiency into precarity for households whose needs are already poorly met. Success therefore cannot be defined by weak growth itself.

Conversely, some aggregate growth during the transition would not automatically count as failure if it came from rapidly building necessary infrastructure, expanding health services, or renovating buildings while the most damaging material flows declined. The test is structural: can the economy increasingly maintain its social functions without requiring generalized material expansion?

This openness protects the book from a simple contradiction. If renovation, health, and infrastructure networks grow faster than the sectors that contract, GDP may rise for a period while still accomplishing a post-growth transition in the institutional sense.

What has to decline is the dependence of stabilizers on broad-based expansion. Whether GDP happens to be positive or negative becomes an outcome of composition, not the target.

A successful architecture can therefore coexist with more than one aggregate growth path, as long as employment, services, balance sheets, and ecological limits remain viable.

This test must be applied institution by institution. A shorter workweek fails if it creates underemployment or an uncompensated loss of income;

environmental taxation fails as a permanent revenue source if its tax base disappears without replacement; a pension system fails if its sustainability implicitly assumes unrealistic future gains; public financing fails if it permanently supports projects without sufficient social value or weakens collective solvency. Overall coherence therefore never excuses the failure of a particular mechanism.

Post-growth, then, is not about stopping the economy. It is about rebuilding its stabilizers so the system can function without requiring continually increasing output.

That means replacing implicit shock absorbers with explicit institutions: share some productivity gains as time instead of relying on higher volumes; finance renewal rather than accumulation; make retirement systems adjustable without hiding who loses; stabilize credit without relying on asset inflation; and fund services from tax bases that can endure.

Markets, profit, debt, and investment do not disappear in this architecture. What disappears is the assumption that each must keep expanding for the system to remain stable.

Macroeconomics cannot answer the final question. Even if this package is technically coherent, how does a society make it legitimate? Who loses income, rents, industries, or power? Which rights have to be protected? How far can a majority limit particular forms of consumption or investment? The next chapter leaves institutional mechanics behind and turns to the central political problem of transition: freedom, democracy, and conflict.

Methodological Notes and Status of the Evidence

- The retirement section does not rely on a single empirical post-growth model. It identifies demographic and accounting constraints that apply across current-pay and funded systems; the U.S. Social Security example is used to make those constraints concrete, not to present Social Security as a post-growth institution.
- The study of 35 post-growth-oriented firms is exploratory and heavily concentrated on small businesses; it does not establish the macroeconomic stability of an entire private sector.
- EUROGREEN, COMPASS, and stock-flow-consistent models are tools for exploring interactions and accounting coherence, not exact forecasts.

- Reduced working time is not treated as a standalone policy; effects on profits, demand, income, and public finances are explicitly acknowledged.
- Debt is not treated as a mathematical requirement for growth; the relevant fragilities lie in balance sheets, expectations, refinancing, and financial structure.

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PART IV — PROVING THAT A TRANSITION IS PREFERABLE AND POSSIBLE

CHAPTER 10 — Freedom, Democracy, and Conflict in a Post-Growth Transition

The previous chapters asked what should change. This one asks the harder question: who gets to decide, and how can a society change deeply without giving up the freedoms the transition is supposed to protect?

The stakes are concrete because transition policy redistributes more than emissions. It redistributes time, jobs, property values, rents, mobility, local tax bases, and sometimes identity. A mine can be the economic history of a town. A car can be the only way to reach work. A house in the wrong place can contain a family's life savings.

A democratic transition cannot treat opponents as obstacles to a plan already written. It also cannot give every affected interest a permanent veto. The challenge is to act under real physical constraints while preserving contestation, protecting genuine losses without freezing old rents forever, and using urgency without turning it into an excuse for suspended democracy.

1. A Policy Can Be Just and Still Lack Legitimacy

In the United States, authority is divided among federal, state, tribal, county, municipal, and regulatory institutions. A rule adopted at one level may impose costs at another. Legitimacy therefore depends partly on who decides, who pays, who administers, who can appeal, and who can revise the rule.

Winning an election is not a blank check over every policy instrument. Between a campaign mandate and a concrete rule lie justification, notice, equal treatment, legal process, appeal, and the ability of affected people to understand what is being required.

That creates a simple obligation: make the reasons public. What problem is the policy addressing? Why does it require collective action? What alternatives were considered? How will results be measured? And where the decision turns on values rather than facts, that trade-off should be stated openly.

So far, we have evaluated policies by their outcomes: emissions, materials, employment, income, health, autonomy. A procedural dimension must be added. Two materially identical policies can be experienced very differently depending on how they were decided.

A rule can be redistributive and still appear arbitrary if no one explains its objective. A consultation can involve hundreds of citizens and still produce distrust if the essential decisions had already been made before it began. Financial compensation can seem insulting if it arrives after a closure has been announced without negotiation.

This dimension is not cosmetic. Governance research shows that people also judge a decision by whether they had the opportunity to be heard, the quality of the explanations given, and the respect shown during the procedure. Outcome justice and procedural justice can reinforce or contradict one another.

We must distinguish obedience from legitimacy. A population may comply with a rule out of fear of sanctions while considering it unjust. In the short term, behavior changes; in the long term, the rule remains vulnerable to evasion, electoral reversal, or withdrawal of cooperation. For a transformation that must last several decades, this difference becomes decisive.

A legitimate policy is not necessarily a popular one. A decision can remain costly and contested while still being recognized as having been made under fair rules. This is precisely what democracy can produce that is more durable than instant consent: the possibility of accepting a decision one would not have chosen personally because the procedure remains fair, revisable, and general.

This distinction requires separating three questions that public debate easily conflates. Is a measure justified by a real problem? Is it adopted through a procedure that respects those affected? Does it actually produce the announced results? A positive answer to one does not guarantee the other two.

A tax may target a well-established harm and still be distributed unfairly. A procedure may be impeccably deliberative and lead to an ineffective policy. Conversely, a technically effective measure may be politically fragile if it rests on opacity, contempt, or the absence of appeal. The transition must hold these three dimensions together instead of using one as an alibi for the others.

This plurality of criteria also guards against a common temptation in periods of urgency: treating speed as a value superior to all others. There are situations in which urgency justifies rapid action; it does not thereby turn every form of contestation into an illegitimate obstacle. The more costly, durable, and difficult to reverse a measure is, the stronger its justification and safeguards must be.

The consequence is demanding: a degrowth policy cannot merely announce that it is just because it protects the climate. It must show why the constraint is necessary, who discussed it, who is accountable for it, who can challenge it, and what happens when its real effects diverge from forecasts.

2. Freedom: When Is a Collective Limit Legitimate?

Property makes the tension obvious. Regulation can limit the use of private property when that use creates public harm. But expropriation, forced closure, or a major loss in value raises a different level of constraint. Predictability, due process, appeal, and—where appropriate—compensation become central.

Freedom is not the absence of all rules. Nor is it simply the maximum number of options. It is the practical ability to shape one's life within rules that keep other people from systematically destroying that same ability.

Proportionality is the key test. A restriction should address an identifiable harm, have a reasonable chance of working, and avoid destroying unrelated capabilities where less restrictive means are available.

The word freedom is often invoked as if every restriction on consumption constituted the same kind of infringement. Yet no society leaves private uses entirely independent of their collective consequences. We regulate speed, noise, toxic substances, construction, industrial emissions, and the use of public space.

The existence of an externality does not, however, justify just any measure. A legitimate limit must satisfy several tests. The collective harm must be sufficiently established. The measure must actually contribute to reducing it. It must be proportionate. It must treat comparable situations consistently. And above all, people who lose an important option should, when reasonably possible, have access to an alternative.

Proportionality can be examined as a sequence. First: what collective harm are we trying to reduce? Second: does the chosen instrument actually act on that harm? Third: is there a less restrictive means that achieves a comparable result? Fourth: who bears the cost of the restriction, and which essential capabilities are affected? Finally: is appeal or revision possible if the assumptions prove wrong?

This logic prevents us from treating all freedoms as equivalent. Preventing a local nuisance, limiting advertising, lowering a speed limit, or banning dangerous equipment do not implicate the same dimensions as restricting movement, imposing generalized surveillance, or carrying out an expropriation. The single vocabulary of "constraint" conceals infringements that differ in nature and severity.

Fundamental rights here set a limit on the simple aggregation of benefits. A majority should not be able to make just any infringement acceptable by adding up diffuse gains. Non-discrimination, judicial review, privacy, freedom of expression, and protection against arbitrariness are not merely variables that can be offset by a few metric tons of carbon avoided.

This last condition changes the conception of freedom. A car ban in a neighborhood served by subway, bus, walking, and cycling does not have the same effect as an identical ban in a rural area with no alternative. Legally, the rule may be the same; in practice, the capacity to choose is not.

A democratic sufficiency policy should therefore seek less to administer preferences than to organize the conditions of choice. It can set a common ceiling—on emissions, land take, or pollution—while leaving several ways to comply. The more it reduces the number of possible behaviors, the more precisely it must justify that reduction.

Irreducible conflicts will remain. Rail infrastructure may require expropriation. A protected natural area may prohibit a private project. An efficiency standard may render equipment obsolete. Democracy does not

eliminate constraint; it requires that constraint be contestable and justified.

Proportionality can be translated into a simple rule: among effective instruments, choose the one that preserves the most capabilities while still achieving the collective result. This requires comparing restrictions with one another. A low-profile technical standard may sometimes preserve more freedom than explicit rationing; in other cases, a tax may be more unjust than a universal standard accompanied by assistance.

The debate about freedom must also incorporate economic power. The absence of a prohibition is not complete freedom when a person has only one practicable option. An employee forced to drive for an hour because no public transportation exists is not free in the same sense as a driver who has several alternatives. The transition can therefore increase real freedom while restricting certain options, if it simultaneously expands capabilities for access.

3. People Need to Believe a Policy Is Fair—and That It Works

Fairness is procedural as well as distributive. People experience the same cost differently depending on whether the rule is understandable, whether powerful actors appear subject to it too, and whether mistakes can be challenged.

Two questions repeatedly shape support: does this policy accomplish anything, and am I carrying more than my share? Those perceptions can be wrong, but ignoring them is politically expensive.

The answer is not better messaging for a bad policy. It is to reduce the gap between perception and structure: publish the evidence, explain exemptions, show who bears what cost, acknowledge uncertainty, and fix real inconsistencies when they appear.

Governments repeatedly discover that an economically rational policy can be rejected even when its average cost is modest. The lazy explanation is to blame ignorance. International surveys show a more structured reality.

In the OECD–Harvard survey of more than forty thousand people across twenty major emitting countries, concern about climate change is widespread, but support varies greatly by policy instrument. Policies receive

more support when citizens judge them effective, fair, and administered by trustworthy institutions.

This does not mean perception is always correct. A tax may be more progressive than the public believes; a ban may have a smaller climate effect than advertised. But a policy whose mechanism remains opaque leaves the field open to competing interpretations.

Chapter 6 showed that a carbon tax could become regressive or progressive depending on redistribution. Here a second layer appears: even objectively sufficient compensation can fail if no one believes it will be paid, if the rules keep changing, or if some groups appear to benefit from exemptions.

A credible transition has to publish its assumptions and results: what the measure costs, what it actually reduces, who receives what, and which indicators would trigger revision. Trust cannot be commanded; traceability can make it more rational.

This transparency must include errors. An institution that communicates only successes turns every correction into a scandalous admission. A long transition should instead announce from the outset that it will include revisable assumptions, pilot measures, and independent evaluations. The ability to admit an error becomes a resource for trust when it is built into the procedure, not merely a political weakness.

Monitoring indicators must also avoid opportunistic selection. A transportation policy cannot be declared successful because electric-vehicle sales are rising if congestion, average fleet mass, or total emissions remain unchanged. A renovation policy cannot be celebrated by the number of projects if vulnerable households remain excluded. Transparency therefore applies to failure criteria as much as to objectives.

4. Participation Has to Be Real

Participation can supply knowledge experts do not have. Residents know schedules, travel patterns, job constraints, service failures, and local risks that may never appear in a national model.

But participation is meaningful only when the mandate is clear. Asking people to deliberate over details when the principle, timetable, and costs are already fixed is theater. A process can still be limited without being dishonest if everyone knows what is open and what is not.

Participation also has material prerequisites: time, compensation, transportation, childcare, language access, disability access, and usable information. Otherwise the process selects the people with the most spare capacity and then calls them "the public."

Citizen participation has become an almost automatic response to distrust. But consultation is not always democratization. A process can multiply workshops, platforms, and questionnaires without transferring any real power of influence.

The OECD recommends precisely defining, before participation begins, the real space in which citizens will be able to act. If the authority has already fixed the outcome, it should acknowledge that and explain the reasons for closing the issue rather than create a participatory stage.

A credible process includes at least four commitments: specify the mandate; guarantee access to competing information; make visible how contributions influence the decision; and respond publicly to rejected recommendations.

Random selection adds a particular quality. It can form a small group far more diverse than a public meeting attended mainly by citizens who are already mobilized. Between 1979 and 2023, the OECD recorded more than seven hundred representative deliberative processes in its member countries, with strong recent growth in environmental topics.

But a mini-public does not become sovereign merely because it is representative. Its legitimacy differs from that of an elected parliament. It can learn, hear experts, explore compromises, and formulate recommendations; final legislative authority must remain clear.

The quality of participation also depends on the information environment. A randomly selected panel can still become dependent on the experts presented to it if disagreement is badly mapped. Robust facts, uncertainties, value conflicts, and affected interests have to remain distinguishable so that expertise is usable without becoming unchallengeable.

Time is another democratic resource. A consultation open for only a few days favors organizations that are already prepared and citizens who are available. Serious deliberation sometimes compensates participation, covers family constraints, and allows time for learning. Without this, formal equality of participation reproduces inequalities of availability.

5. Ireland and Washington State: Deliberation Depends on Follow-Through

Any major deliberative process needs an explicit follow-up mechanism. Recommendations should not disappear into an agency, a committee, or the news cycle once the meetings end.

Ireland provides one model of a deliberative process formally connected to national political institutions. Washington State offers a different one. In 2021, the Washington Climate Assembly selected 80 residents through stratified random selection; 77 ultimately participated in the seven-week deliberative process and developed recommendations for consideration by the state legislature.

The contrast is useful because a citizens' assembly does not acquire authority merely by existing. Its democratic value depends on the chain between mandate, deliberation, official response, and later decision-making.

Washington's assembly was designed to inform legislators rather than act as a parallel legislature. That limitation is legitimate if it is explicit. The institutional risk begins when participants or the public cannot tell what kind of response recommendations will receive or how they enter the formal policy process.

The broader lesson is procedural: every major recommendation should be traceable to an official response—adopted, modified, rejected, or deferred—with reasons. Participation without traceability can become a symbolic resource that institutions consume without changing how decisions are made.

Washington's assembly also shows why independence and institutional connection are not the same thing. The process was organized outside the legislature itself, while its recommendations were explicitly directed toward lawmakers and the wider public.

That design protected deliberation from being reduced to a legislative hearing, but it also limited the assembly's formal authority. Its recommendations could inform public debate and elected officials; they did not become law automatically.

This is precisely why the mandate matters. Participants should know whether they are advising, proposing, deciding, or triggering a formal

legislative response. Ambiguity about that status creates expectations no deliberative process can reliably satisfy.

A process becomes stronger when the institutional relay is explicit from the start: who receives the recommendations, what kind of response is expected, and which body remains legally responsible for the decision.

Ireland illustrates a more formalized relay into national political institutions. Washington illustrates a clearly advisory assembly aimed at informing legislators and the broader public. Neither model makes citizen deliberation sovereign.

The transferable lesson is narrower: participation gains democratic value when its role in the decision chain is visible, limited honestly, and followed by traceable institutional response.

Selection by lottery is not enough by itself. What matters is whether deliberation produces usable knowledge, whether participants understand their mandate, and whether public institutions can show what happened to the recommendations afterward.

6. The People Who Lose Are Real

Losses unfold over time. A household can absorb an upfront cost and later save money. A worker can lose a stable job and eventually find a better one. A region can suffer years of disruption before diversification works. The endpoint does not erase the transition path.

National job totals can hide the human reality. Workers are not interchangeable units. Skills, seniority, housing, family networks, health coverage, and professional identity are tied to place and time.

Not every loss deserves the same protection. The loss of an essential income is different from the loss of a speculative rent or a tax preference. But refusing to preserve a rent does not justify treating the people organized around the old institution with contempt.

A transition often produces diffuse benefits and concentrated losses. The air across an entire region improves; a few thousand workers lose their occupation. The global climate benefits from a closure; a town loses tax revenue, businesses, and part of its identity.

National statistics can then mislead through aggregation. Ten thousand renewable-energy jobs do not automatically compensate for two thousand mining jobs lost if the new jobs are hundreds of kilometers away, require different skills, or pay much less.

A serious policy must track the trajectories of people and places, not merely net balances. What percentage of workers find another job? At what pay? After how many months? What share relocate? What happens to local revenues, real estate, schools, and subcontractors?

This requirement changes the meaning of a "just transition." It is not a promise that no one will lose. Some rents and some assets will have to lose value. It is a commitment that necessary losses will neither be made invisible nor abandoned to those with the least capacity to adapt.

It also requires thinking about stranded assets at the household level. A policy may reduce the value of a home located far from transportation, a specialized vehicle, or a professional skill. The response cannot be the same as for a diversified company capable of absorbing the shock. Transition justice therefore depends on adaptive capacity, not only on the size of the accounting loss.

Places can concentrate several losses at once: jobs, tax revenue, identity, subcontracting activity, real-estate value, and collective confidence. This is why the conversion of a local economic basin cannot be reduced to individually retraining workers. A retrained person remains in difficulty if no employer exists nearby. Policy must sometimes rebuild a local economy at the same time.

7. Ruhr and Appalachia: Prepare Before the Collapse

Regional transition cannot be run entirely from Washington—or entirely from the affected region. Central funding can ignore local economic networks, while purely local control can be captured by the dominant industry.

The best time to prepare for transition is before collapse. Once a region loses employment, tax revenue, investment, and confidence at the same time, every intervention becomes harder.

The Ruhr is not a model to copy. It illustrates functions: long-term public investment, diversification, training institutions, and organizations able

to survive across political cycles. Appalachia shows how concentrated industrial decline can leave persistent economic gaps when replacement institutions remain fragmented.

Germany's Ruhr region is often presented as a model of conversion. The term should be used cautiously: the transformation took decades, was costly, and did not eliminate every social problem. But it shows what a regional strategy can change.

Coal employment there fell from several hundred thousand workers to a few thousand. Instead of waiting for collapse, public authorities, businesses, and unions gradually organized early retirement, training, reassignment, infrastructure, universities, research, and economic diversification.

The result was not a mechanical replacement of miners by engineers. Industrial jobs disappeared and the social structure changed. But the region avoided part of the exodus and collapse observed elsewhere, while services and new sectors developed.

The American Appalachians illustrate a much more difficult scenario. Between 2005 and 2020, coal production fell by more than sixty-five percent and employment in the sector by more than half. In some counties, public revenues collapsed along with the mines, leading to cuts in schools and other services.

The OECD emphasizes several factors: geographic dispersion, lack of alternative opportunities, weaknesses in some educational infrastructure, and the absence of a coherent regional strategy on the scale of the shock.

The comparison does not prove that Germany found a universal recipe. It shows a difference in timing: when decline is anticipated, institutions can be transformed before closure. When adjustment is treated as a local consequence of market change, the region absorbs the shock on its own.

The Ruhr comparison also shows the cost of anticipation. German support was expensive, sometimes very expensive per worker. But the relevant comparison is not a visible transition budget against an imaginary cost-free status quo. It is the full cost of managed transition against the full cost of disorderly decline: unemployment, health damage, lost tax revenue, forced migration, and abandoned infrastructure.

The Appalachian case, for its part, is a reminder that a transition can occur without a deliberate climate policy. Coal declined because of competition from gas, productivity, and other factors. The absence of a plan therefore does not prevent transition; it means that markets and shocks play a larger role in deciding who pays. The political question is not transition or no transition, but an organized transition or one that is endured.

Compensation then takes on a precise meaning. It should not pay indefinitely to keep coal going. It finances the time needed for people and regions to develop another economic base.

8. Compensate Losses Without Turning Rents Into Rights

Compensation has to be understandable. Individually negotiated deals with the best-organized actors quickly create the impression that the rules change with political power.

Compensation can serve different purposes: protect a minimum standard of living, finance adaptation, or secure agreement from a politically powerful group. Those purposes should not be hidden under one moral label.

Time limits matter too. Temporary income support can cushion a closure while workers and regions adjust. Permanent subsidies to an activity scheduled to disappear can instead lock the old dependence in place.

The word compensation raises a legitimate objection: why pay those who benefited from a polluting activity? The answer depends on what is being compensated.

A shareholder who loses a future rent is not in the same situation as a fifty-eight-year-old worker whose skills are specific to an industry closed by public decision. The owner of a highly emitting asset is not automatically entitled to the value they would have obtained if the rules had never changed.

Compensation should therefore target adaptive capacity and legitimate prior commitments. Training, transitional income, early retirement, mobility, site conversion, or temporary fiscal support for a local government can be justified without guaranteeing the future profits of an incompatible business model.

It must also have an end point. A subsidy that indefinitely maintains an activity the policy seeks to eliminate turns the transition into a budgetary contradiction. Support must shift resources toward the new trajectory.

The test is simple: at the end of the program, is the beneficiary or the region less dependent on the activity that was supposed to be reduced? If the answer is no, the compensation has probably protected the past rather than financed adaptation.

A second test concerns who actually benefits. A large regional funding package can flow mainly to property owners, major projects, or consultants while doing little for workers' adaptive capacity. Programs should therefore track income, employment, health, and mobility trajectories alongside the money committed.

Finally, compensation must distinguish insured risk from speculative rent. The more an actor could reasonably anticipate a change in the rules, the less reason society has to guarantee that actor's future value. This distinction prevents a climate signal announced for decades from being turned into a perpetual right to full compensation.

9. Build Alternatives Before Closing Old Paths

Sequencing also reduces uncertainty. A limited first stage can reveal behavior, costs, and bottlenecks before a policy is scaled. But a permanent pilot is simply another form of delay; experiments need preannounced criteria for expansion, revision, or abandonment.

Order changes how coercive a policy feels in practice. Expanding transit before restricting driving, retrofitting homes before sharply raising energy costs, or financing retraining before a closure can make the same physical objective much less destructive.

Perfection cannot become a veto. Alternatives will rarely be complete before the first constraint. The practical test is whether most affected people have a workable path out and whether those who do not have specific protection.

Sequencing is a form of justice. A standard may be reasonable on a five-year horizon and brutal if it takes effect tomorrow. A ban can become bearable once the infrastructure needed to comply already exists.

Stockholm's congestion charge offers an illuminating case. In 2006, the charge was not introduced directly as a permanent policy. The city organized a trial lasting several months. Expansion of public transportation had begun before the charge took effect and continued during the trial period.

This sequence served several functions. Drivers had additional alternatives. Public transportation could absorb part of the modal shift. Citizens could directly observe the effects on traffic and congestion. And above all, the policy remained reversible before the referendum.

Studies show that acceptance was higher after the trial than before it. Residents were more able to see the benefits and perceived some costs as less significant than they had imagined. One specific analysis attributes part of the success to improvements in public transportation.

This case is politically valuable because it reverses the usual order. Instead of asking the public to believe a model, people were allowed to experience the measure before voting on whether to make it permanent.

Not every problem obviously allows for a reversible trial. The disappearance of an old-growth forest cannot be tested for six months. But when uncertainty and opposition concern the everyday consequences of a policy, experimentation can become a democratic institution.

When a trial is possible, its design must prevent a false test. If additional transportation begins only after the charge, the trial mainly measures the difficulty of a constraint without alternatives. If renovation assistance arrives only after a rental ban, the objective is being confused with a poor sequence. Testing a policy means testing the full package that should exist under permanent conditions.

Sequencing can also create beneficiaries before losers. A renovation sector, more frequent transportation, or funded training programs produce visible jobs and services before the most costly restrictions take effect. This strategy does not guarantee support, but it changes the political coalition present when conflict occurs.

10. Disagreement Is Not Obstruction

A transition that redistributes economic power will produce genuine conflict. Businesses, unions, communities, advocacy groups, and

governments will defend different interests. Democracy does not eliminate that conflict; it organizes it.

Appeals, demonstrations, strikes, litigation, bargaining, campaigns, and public opposition can slow policy down. That is sometimes exactly what they are supposed to do when they expose an error, an injustice, or an ignored cost.

Opposition is not the same thing as capture. Fraud, clandestine influence, threats, illegal obstruction, and regulatory capture can be restricted under general rules. But those rules have to apply to every side, not merely to the interests government officials dislike.

An ambitious transition will necessarily encounter opposing arguments. A company may explain that a standard makes a process impossible. A union may reject a timetable. A local government may show that national infrastructure would destroy its local economy. These objections should not be disqualified merely because they come from affected interests.

But not all actors enter deliberation with the same resources. A large company can fund expertise, communications, and lobbying for years; a diffuse group of future beneficiaries often has no comparable organization.

Democratic institutions should protect the right to defend an interest while making the weight behind that interest visible. Lobbying registers, published meetings, conflict-of-interest disclosure, competing expertise, and transparent funding make it easier to distinguish arguments from power.

Some blocking strategies can also exploit uncertainty to delay a decision indefinitely. Demanding absolute certainty before any policy action then becomes a way of preserving the status quo. The procedure must be able to conclude even when disagreement remains.

The goal is not to remove losers from the debate. It is to prevent an actor, solely through its economic power, from obtaining a veto greater than the one democratic institutions have granted it.

This distinction also protects public debate from another drift: labeling every objection that slows action as obstruction. A democracy must tolerate actors defending even interests that the majority considers outdated. What becomes problematic is not the interest itself, but

organized deception, opacity, regulatory capture, or the ability to buy disproportionate access.

The same transparency standards should apply to every side, including environmental organizations and public experts. Funding, conflicts of interest, methods, and assumptions should be accessible regardless of the position being defended.

11. A Policy Has to Survive the Next Election

Durability starts with honest promises. A coalition can win by minimizing costs and then lose credibility as soon as those costs become visible. A stronger mandate tells voters about the trade-offs before they arrive.

Political durability does not require making a policy untouchable. It means creating enough visible benefit, predictability, and legitimacy that a change in governing party does not automatically erase the entire direction.

Distribution shapes that durability. Policies with broad benefits and concentrated losses create predictable centers of resistance. A credible path for the people and places bearing those losses is part of political design, not an afterthought.

Ecological time and electoral time do not coincide. Energy infrastructure may take fifteen years to build; a government may fall in two. A tax or standard can be repealed before it has produced its benefits.

This reversibility is not an anomaly: it is a property of democracy. A people must be able to change policy. The problem is therefore to build a transition legitimate enough that alternation in power changes its form without necessarily canceling its entire direction.

Some policies create their own coalitions of support. A rail network used every day, a renovation that lowers a bill, a new industrial sector, or transition income become concrete benefits. Eliminating them then carries a visible political cost.

Other policies create mainly visible losers and distant benefits. They remain fragile. This does not mean every costly measure should be abandoned; it means political stability must enter the analysis of effectiveness.

A twenty-year trajectory that survives four governments may achieve greater reductions than a theoretically perfect program repealed after two years. Democracy therefore requires thinking not only about the right decision, but about the gradual construction of a majority capable of living with it.

This idea requires distinguishing stability from lock-in. A stable institution survives because it provides services, distributes benefits, and retains legitimacy. A lock-in survives because reversing it is legally or financially very costly. The first form is democratically desirable; the second should remain exceptional.

Transition policies should therefore seek open positive feedbacks: infrastructure useful to broad groups, transferable skills, visible energy savings, local income, and better air quality. The more diffuse and everyday the benefit, the less the trajectory depends on a single government or a single activist coalition.

12. Preserve the Right to Change Course

Institutions also need the ability to admit error without treating correction as political collapse. When every retreat is called betrayal, governments acquire an incentive to defend bad policy for the sake of consistency.

Reversibility should reflect the inertia of the decision. Tax rules can change relatively quickly. Rail systems, power plants, and urban development shape decades. The harder a decision is to reverse, the stronger the case for scenario testing and built-in adaptability before committing.

Review clauses, pilots, and periodic evaluation matter only if results can change policy. An evaluation with no consequence is ritual. Constant reopening of decisions, on the other hand, can make long-term planning impossible.

A serious review rule therefore states in advance what will be measured, when the review occurs, and what kind of result would trigger revision.

Correction also requires administrative capacity: reliable data, technical staff, coordination across levels of government, implementation capacity, and safeguards against capture.

Democratic authorization without implementation capacity can fail. Technocratic capacity without accountability can fail too.

The deepest danger appears when ecological goals are treated as so important that they should no longer be politically contestable. That would destroy the human sovereignty the transition is meant to preserve.

Physical constraints are not decided by majority vote. Political instruments are. Carbon retains its physical properties no matter who wins an election; the allocation of effort, technology choice, timing, and institutional design remain contestable.

A democratic transition can fail even when participation is extensive. It fails if ecological pressures do not fall fast enough, if participation never changes decisions, if compensation becomes permanent rent, if promised alternatives remain inaccessible, or if electoral reversibility becomes an excuse for endless delay.

The aim is a difficult balance: enough continuity to transform slow systems, enough openness to correct mistakes.

That includes an uncomfortable possibility: voters can temporarily choose a less ambitious path than some scientific scenarios recommend. Democracy cannot solve that risk by simply removing the choice from the public.

The answer is institutions that keep consequences visible, protect factual integrity, honor legitimately adopted legal commitments, and leave political instruments open to challenge and revision.

Methodological Notes and Limits of the Evidence

- The Irish case illustrates an institutional chain between deliberation and formal politics. It does not show that citizen recommendations caused later climate progress or that Ireland is on its target pathway.
- The Washington Climate Assembly is used as a U.S. example of representative deliberation with an explicitly advisory role. It does not establish that its recommendations caused later Washington climate legislation.
- The Ruhr/Appalachia comparison is institutional and historical; fiscal, geographic, social, and labor-market contexts differ.
- The Stockholm congestion-pricing case illustrates sequencing and reversible experimentation in urban transportation, not a universal climate-policy template.

- Electoral durability is treated as a condition of effectiveness in a democracy, not as a test of scientific truth.

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CHAPTER 11 — What Degrowth Still Has to Prove

A political theory becomes dangerous when every inconvenient fact can be explained away. For ten chapters, this book has built the strongest case it can for reducing dependence on perpetual expansion. This chapter does the opposite: it asks what evidence would force that case to narrow.

This is not rhetorical humility. If no future observation can count against degrowth, then degrowth is no longer a testable political proposition. It has become an identity. Green growth cannot be dismissed by definition, political opposition cannot always be called false consciousness, and institutional failure cannot always be blamed on remnants of the old system.

The rule here is strict: an objection is valuable precisely to the extent that it can destroy part of the argument.

1. A Serious Theory Has to Say How It Could Be Wrong

Not every claim in this book is the same kind of claim. Justice, autonomy, and protection of basic needs are normative commitments. They are not falsifiable in the same way as a claim about emissions or material intensity. What can be tested is whether the proposed institutions actually serve those commitments and what unintended consequences they create.

That distinction matters in a book crossing economics, ecology, politics, and social theory. Otherwise one domain can become an escape route from another: ecological disappointment explained away economically, economic failure justified morally, political resistance dismissed psychologically. A serious theory needs places where reality can force revision.

Social and institutional falsifiability is not the same as a laboratory test. One failed policy in one place may reflect local conditions. But repeated failures under comparable conditions, or a persistent absence of the predicted effect, have to count. The standard cannot be rewritten afterward solely to save the thesis.

The core claim of this book is not that all growth is bad. It is that rich economies should not depend on permanently increasing material and energy flows to maintain employment, public finances, financial stability, and well-being. It also argues that a planned reduction in certain flows can be compatible with greater justice and autonomy.

These propositions are more defensible than the slogan "GDP must fall." They are nevertheless empirical. If a rich economy shows that it can durably respect several ecological limits while maintaining good social outcomes through green growth, then our diagnosis of necessity must change. If a sufficiency policy systematically worsens health, autonomy, or employment despite serious design, it should be abandoned in that domain.

But the opposite error matters too. Evidence that defeats one local claim does not automatically defeat the entire project. Faster green decoupling could weaken the case for macroeconomic contraction without invalidating physical limits. A failed shorter-workweek policy could require a different employment institution without restoring growth as the goal. A bad administrative design could justify more decentralization without removing the ecological constraint. Contrary evidence should revise the proposition it actually reaches—no more, no less.

Falsifiability does not mean that a single experiment decides everything. Social systems are open, historical, and difficult to reproduce. It means announcing in advance which observations would genuinely count against us.

In a social system, hypotheses are rarely tested one at a time. A tax increase may coincide with an energy crisis; reduced working time with a labor shortage; falling emissions with a recession. Testing therefore requires a plurality of methods: historical comparisons, local experiments, models, quasi-experiments, surveys, and physical accounting.

The quality of a thesis is also measured by how it treats ambiguous results. A contrary result should not automatically be explained by saying the policy was not "degrowth enough." That response would immunize the proposition against reality. The necessary conditions must be specified in advance, and failure under those conditions must then be allowed to count.

Conversely, a local success is not enough either. A city may reduce traffic because it has a dense network that a rural area lacks. A company may operate successfully on a four-day week in a sector where work is easily reorganized. Extrapolation must remain a hypothesis.

2. Does Degrowth Have Enough Evidence?

Different claims require different standards of evidence. A descriptive statistic can establish a trend; it cannot establish causation. A model can explore a scenario; it cannot certify a forecast. A case study can reveal a mechanism; it cannot guarantee that the mechanism generalizes.

The problem is not a lack of research. There are thousands of studies on energy, materials, inequality, working time, transportation, well-being, business, finance, and taxation. The harder problem is architectural: whether mechanisms studied separately remain compatible when assembled into one social system.

That means keeping three levels separate: evidence for a mechanism, evidence for a policy instrument, and evidence for a whole institutional architecture. A shorter workweek succeeding in some firms does not prove national macroeconomic stability. A carbon price reducing demand does not prove the whole tax system is durable. A coherent model does not prove that voters, firms, banks, and agencies will behave as assumed.

The weakest evidence concerns complete policy packages, because we cannot run two identical national societies for twenty years. The practical response is to accumulate partial evidence, compare historical trajectories, build adversarial scenarios, and preserve negative results instead of filtering them out.

The most embarrassing criticism concerns less planetary limits than the quality of the academic field explicitly devoted to degrowth. Savin and van den Bergh examined 561 publications with “degrowth” or “post-growth” in their titles. Their conclusion is severe: in this sample, nearly nine out of ten texts fall, according to their classification, more into opinion than analysis; quantitative studies, substantial qualitative research, and formal models are a minority; policy evaluation is often weak.

It would be easy to reply that their sample is poorly constructed. That is partly true. Much of the evidence used by post-growth researchers does not include that term in the title. The literature on decoupling, demand-side

mitigation, human needs, material stocks, work sharing, ecological macroeconomics, or universal services functionally belongs to the debate without always presenting itself as "degrowth." Critics of the review are therefore right to reject turning it into an inventory of all the science that can be brought to bear.

But that objection does not make the problem disappear. A movement that proposes reorganizing work, investment, infrastructure, taxation, and consumption must produce more than principles. It needs competing models, ex post evaluations, comparative cases, risky predictions, and failure criteria.

We can specify what is missing. A proposal such as the four-day workweek can be studied at the firm level; a carbon policy can be evaluated after adoption; a macro model can test accounting consistency. But the degrowth thesis combines several mechanisms at once. The more systemic it becomes, the more evidence must move from local studies to tests of interaction. What works separately may produce a contradiction once combined.

This is where comparison with engineering is useful, though imperfect. A bridge is not validated merely because each material is known separately; the full structure is also tested under load. Likewise, knowing the effects of a carbon tax, reduced working time, or a universal service is not enough to demonstrate that an institutional regime combining them will remain stable. The program must gradually move from a catalog of components to testing the architecture.

The right conclusion from this controversy is therefore neither "degrowth is pseudoscientific" nor "the critics have read nothing." It is more uncomfortable: the empirical literature is improving quickly, but the program's political ambition remains ahead of its large-scale demonstration.

The field explicitly labeled "degrowth" may be methodologically weaker than the disciplines from which it borrows results, without those results thereby becoming false. But this dispersion creates a problem of intellectual governance: proposals are often assembled from studies that have never tested the full policy package.

The reasonable response is a program of gradual evidence-building. Test isolable mechanisms separately; build coherent models for interactions;

experiment with packages at small scale when possible; document failures; systematically compare alternative trajectories. This program is less spectacular than a promise of global proof, but it is far more robust.

It also requires publishing more negative results. If reduced working time degrades a service, if a redistributive tax fails to alter flows, or if a conversion produces jobs that are too precarious, the movement must be able to integrate those results without treating them as ideological attacks.

3. The Hard Test for Green Growth

Any fair comparison also has to include lock-in and reversibility. A technology-heavy strategy may require large investments before performance is known. Demand-reduction strategies can create their own rigidities too. A slightly weaker central-case outcome may be preferable if it remains more robust when assumptions change.

Green growth has to be treated as a serious competing hypothesis. Monetary value could continue rising while emissions, extraction, and other pressures fall fast enough through electrification, low-carbon energy, efficiency, substitution, circularity, and changes in demand. Nothing in this book rules that out by definition.

The disagreement is about scale, speed, breadth, and risk. The faster output grows, the faster material and carbon intensity must fall for absolute pressure to decline. Post-growth reduces that technical burden by lowering some volumes; in exchange, it creates harder institutional and political problems. The comparison has to be between those risk profiles, not between technology and morality.

The best strategy might in fact be hybrid: rapid growth in low-carbon sectors and essential services, contraction in highly material or no-longer-useful sectors, intense innovation, and reductions in some forms of consumption. In that case, aggregate GDP could move in a direction that is difficult to predict. Such a result would reinforce the book's central idea: the sign of GDP is not the right decision criterion.

Green growth deserves to be tested in its strongest version, not in a caricature in which a few solar panels are supposed to offset infinite consumption. Its strong version combines low-carbon energy, electrification, efficiency, standards, carbon pricing, innovation, circularity, public investment, and reductions in imported emissions.

The test must be symmetrical. It would be trivial to compare ideal degrowth with poorly executed green growth. We must compare the best plausible versions of both strategies under the same constraints: the same climate horizon, the same material thresholds, the same requirement of justice, and the same tolerance for technological risk.

Green growth has an institutional advantage: it seeks to preserve most existing stability mechanisms while mainly transforming technologies, prices, and infrastructure. Post-growth has another potential advantage: it reduces the amount of decoupling that must be achieved. These advantages come with inverse costs: technological dependence and speed on one side, institutional and political transformation on the other.

A serious comparison has to judge the path as well as the endpoint: required investment, critical-material demand, transition costs, delay risk, distribution of gains and losses, and the ability to correct course.

And green growth has a real empirical argument: absolute decoupling exists. Several rich economies have, for significant periods, managed to grow GDP while reducing fossil-fuel emissions. This destroys any claim that GDP growth and falling carbon emissions are physically incompatible.

But the decisive test is more demanding than existence. We must ask: fast enough? long enough? for consumption footprints as well as territorial emissions? for materials, biodiversity, land, and water as well as CO_2? with what dependence on imports, nuclear power, renewables, carbon capture, negative emissions, or future innovation?

Both strategies also deserve the same evidentiary standard. Post-growth cannot assume widespread restraint without resistance while demanding proof for every green-growth innovation. Green growth cannot assume unprecedented decoupling rates while requiring post-growth to demonstrate every institution historically.

New modeling work that directly compares "Greener Growth" and "Sufficiency Economies" is valuable for precisely this reason: it places both families within the same analytical framework. It does not deliver a universal verdict, but it finally moves the debate toward comparable assumptions.

Our falsifier can then be stated clearly. If several rich economies manage to reduce their main biophysical pressures in absolute terms, durably and

rapidly enough—including imported footprints—while maintaining growth, social justice, and low dependence on speculative technological assumptions, then the necessity of macroeconomic degrowth no longer holds.

The comparison also has to be multidimensional. A pathway that meets a carbon budget while sharply increasing mineral extraction, habitat loss, or developed land cannot be declared superior on CO_2 alone. But requiring every environmental pressure to decline at every moment would make the test impossible. The main pressures, thresholds, and politically open trade-offs have to be specified in advance.

The same principle applies socially. Green growth that rapidly reduces impacts but sharply increases inequality or makes essential needs more expensive must be compared with genuinely redistributive post-growth. But a post-growth strategy that produces better distributive indicators at the price of persistent unemployment cannot simply declare that GDP does not matter. Each strategy must accept the same scorecard of outcomes.

4. Reduce Physical Pressure Without Worshiping Falling GDP

This position is harder to communicate because it does not provide one clean success number. But that is a strength. A rise in care activity alongside a fall in extraction should not be compressed into one score. The tension itself carries information.

Post-growth policy has to tolerate GDP increases when they come from activities the transition actually needs—retrofitting, grids, care, education, or cleaner industrial capacity. Rejecting those increases because they raise the aggregate would simply invert the old fetish.

The reverse matters just as much. Falling GDP is not success if material pressure barely changes or if essential capabilities collapse. Recession, business failure, weak investment, and household impoverishment can reduce consumption without building a viable post-growth system.

This distinction should make it possible to abandon the term itself if its use prevents the thesis from being understood. A political concept has value only through the function it serves. If "degrowth" becomes synonymous with recession in public debate while the project aims at

something else, the term can be replaced without the material argument disappearing.

This possibility reveals an ambiguity in the very word degrowth. If materials, fossil energy, emissions, and land take fall rapidly, but GDP rises because care, education, culture, software, renovation, or other services expand, have we failed?

The answer developed in the preceding chapters is no. GDP is not our negative objective. We have no reason to engineer a monetary decline that brings no physical or human benefit.

This clarification may appear to weaken degrowth. In reality, it makes it more precise. What must shrink is what exceeds sustainable needs or maintains an unnecessary dependence on expansion: primary extraction, emissions, certain forms of material consumption, accelerated product turnover, and oversized land use and stocks. Other sectors must grow.

If the accounting result of this reorganization is an increase in GDP, it would be absurd to fight it in order to save the movement's name. The thesis must then become agnostic about GDP. The word degrowth retains meaning only if it denotes the organized reduction of excessive production and flows, not a statistical requirement.

This position entails a political consequence that can sometimes be difficult for the movement itself. A policy may be perfectly consistent with the project developed here and yet be presented by a government as "green growth," a "well-being economy," or "industrial transformation." If it genuinely reduces pressures, improves capabilities, and removes dependencies on expansion, disagreement over vocabulary should not become more important than the outcome.

Conversely, a recession accompanied by unemployment, hospital closures, and lower clean investment is not a victory because GDP falls. Chapter 3 already separated planned degrowth from an endured crisis; the final audit must make any return of that confusion impossible merely out of loyalty to the word.

5. Can a Post-Growth Economy Stay Stable?

Stability does not mean freezing the economy in place. Firms can fail and form, sectors can expand and contract, and innovation can continue. The

question is whether those shifts can happen without recurring mass unemployment, financial crisis, or breakdown of essential services.

Chapter 9 laid out plausible mechanisms: work sharing, stable firms, replacement and transition investment, debt management, diversified revenue, retirement-system adjustment, and service financing. The unresolved question is whether they remain compatible when they operate at the same time.

The right test is stress. A post-growth package should survive lower productivity, higher interest rates, faster population aging, a more expensive energy transition, or tax revenue below forecast. If it works only under unusually favorable assumptions, it is not yet a robust alternative.

This requirement also guards against the opposite argument. A current economy that already experiences unemployment, financial crises, underinvestment, and debt is not a benchmark of perfect stability. The comparison must concern relative vulnerabilities and capacity for correction, not an opposition between an imperfect real system and a supposedly perfect future system.

We now have models showing coherent configurations: reduced working time, public investment, redistribution, universal services, more prudent finance, and lower levels of certain flows can coexist with employment and well-being. The problem is that no large rich country has deliberately carried out this entire transition over several decades.

The difference between a model and a society becomes crucial. In a model, the credit rule changes when the researcher modifies an equation. In a real economy, banks may abruptly reduce lending, investors may move capital, households may save out of fear, and businesses may raise margins or delay projects. Unions and governments negotiate. A war changes energy conditions. A pandemic changes the budget.

The question that must be proved is therefore not "can we write a model without growth?" but "can we build stabilizers that withstand these behaviors and shocks?" Chapter 9 proposed mechanisms. They must now be tested together in more simulations and, above all, in real policies.

Repeated macroeconomic failure would count strongly against the thesis. If economies that deliberately reduce their growth dependencies systematically experience more unemployment, inflation, public-sector

insolvency, or financial crises than comparable green-growth trajectories, the institutions will have to be revised or the contraction slowed.

6. What Happens to Innovation When Some Markets Stop Growing?

Innovation cannot become a universal excuse for more volume either. Its value depends on what function improves and what resources the improvement requires.

Growth can support innovation because larger markets help firms recover fixed research and development costs. Stabilizing some markets could therefore reduce incentives in sectors where experimentation is expensive and diffusion is limited. That objection has to be taken seriously.

Public research, procurement, prizes, shared precompetitive research, licensing, patient capital, quality competition, and replacement demand can all support innovation. But sectors differ sharply. Pharmaceuticals, software, steel, and rail do not share the same cost structures or innovation cycles. A post-growth architecture has to show where alternative innovation systems work and where they do not.

The technological objection also works in the other direction. A major innovation may reduce a material constraint enough to change the sectoral conclusion. A genuinely integrative approach should then increase useful production if this new capacity improves outcomes, rather than defend a predetermined reduction in volumes.

An ecological transition needs innovation. Batteries, grids, seasonal storage, low-carbon cement, medicine, adaptation, agriculture, materials, public transportation: some fields must advance quickly. Degrowth cannot answer this need with a general critique of technology.

Part of innovation depends on expanding markets and expected profits. Another part comes from public research, universities, collective procurement, cooperation, or strategic missions. The mix varies by sector.

We must also distinguish product innovation from system innovation. An economy that repairs more may need fewer new devices but more diagnostic processes, standardized parts, reverse logistics, and modular design. A city that reduces car use may innovate in ticketing, network

management, or urban planning. The volume of objects therefore does not directly measure the intensity of innovation.

But this observation must not become an escape hatch. Some technologies genuinely require billions in upfront capital, complex supply chains, and international markets large enough to spread fixed costs. Post-growth must show how it preserves these economies of scale when they serve an essential function, even if it seeks to reduce scale in other sectors.

The risk would be that a contraction policy indiscriminately reduces investment and venture capital just when clean capacities need to grow. The answer cannot be "the state will replace everything." It must show how financing and skills move from declining activities toward necessary ones.

The test is sectoral. If post-growth durably reduces the pace of innovation or diffusion in essential sectors, it must loosen the constraints affecting them. An economy of sufficiency is not an economy of minimal capacity.

7. Can a Democratic Majority Be Built—and Kept?

A durable coalition will include people who do not care about the word degrowth. They may support the same policy because of health, household costs, energy security, local jobs, or urban quality. Shared policy does not require shared philosophy.

Survey approval, support for one policy, preference among competing packages, and an actual election result are different things. A person can favor lower inequality and oppose a particular tax. They can like shorter workweeks and vote against the party proposing them for unrelated reasons.

The first visible loss is often the real political test. Future beneficiaries are diffuse; immediate losers may be organized. Compensation, sequencing, retraining, and regional transition are therefore part of political feasibility, not optional moral decoration.

The strongest test remains alternation in power. A policy that works only as long as its sponsor remains in office is not yet stabilized. Its maintenance, adjustment, or even partial appropriation by an opposing camp constitutes stronger evidence of democratic durability than initial support.

The political weakness of degrowth is often asserted as self-evident. Recent evidence requires greater precision. In the United States, experiments find significant support for several policies associated with the program, including universal services and certain limits on fossil fuels.

More surprisingly, Krpan and colleagues tested a much more comprehensive proposal in the United Kingdom and the United States in 2025. In their British experiments, about four out of five participants supported the proposal presented. That result does not look like a program that is intrinsically impossible to defend.

The result is also sensitive to framing. Presenting a coherent package of measures together with its collective benefits is not equivalent to asking separately: would you accept a higher tax on a flight, advertising restrictions, a lower speed limit, or a tax increase? Political attitudes are shaped by context, partisan coalitions, and perceptions of what others will do.

Research published in 2026 on the feasibility of climate policies in Europe likewise emphasizes a "conditional middle": many citizens are neither systematically supportive nor systematically hostile. They support some measures and reject others. This intermediate group makes politics more open than a simple divide between environmentalists and opponents, but it also makes the coalition more fragile.

The decisive evidence would therefore be longitudinal: following the same populations before the policy, during the conflict, after paying the cost, and after experiencing the benefits. Very few explicitly post-growth policies have yet been tested in this way.

But a questionnaire is not an election. Support for a vision presented as coherent and fair is not the same phenomenon as voting on a visible tax, a plant closure, or a traffic restriction. Research on individual policies shows precisely a wide dispersion: some social instruments are more popular than some direct restrictions.

Political evidence also comes in levels: agreement with principles, stated support for measures, electoral choice when costs are contested, and support after implementation. Those levels should not be treated as interchangeable.

Degrowth now has more evidence at the first two levels than was often claimed a few years ago. It still has much to prove at the final two. A

theoretical majority that disappears as soon as the costs become concrete does not constitute a transition strategy.

8. What Degrowth Looks Like from the Global South

Convergence requires more than rich countries consuming less. Lower demand in wealthy economies does not automatically finance water systems, housing, hospitals, schools, or clean power elsewhere. Finance, technology transfer, market access, and rules for materials all matter.

The distinction between rich and poor countries is crude, but the asymmetry is real. Many populations still need large additions to essential material stocks. Asking them for across-the-board contraction would turn ecological limits into a mechanism for freezing deprivation.

The strongest formulation is convergence: reduce excess where stocks and consumption are already high; allow targeted material expansion where basic capabilities remain unmet; seek stabilization once essential infrastructure is in place.

Affluent countries cannot call their transition just if they secure minerals, land, or energy by shifting the damage elsewhere. Supply chains are part of the justice test. Domestic decarbonization purchased through uncontrolled extractive pressure abroad does not satisfy the argument of this book.

One of the gravest mistakes would be to turn a diagnosis of rich economies into a universal model. Many regions need more durable housing, hospitals, water networks, sanitation, electricity, transportation, and schools. This material growth is not a failure of sufficiency; it is a condition for it.

Recent work on decent living standards gives a scale to this necessity. Streeck and colleagues estimate that closing global deficits in the material stocks needed for essential needs would require roughly a twelve percent increase in the existing global material stock if new investment were directed straight toward those needs.

The global figure conceals a radical asymmetry. In most rich countries, the stocks capable of providing decent living standards already exist almost entirely. In sub-Saharan Africa, average material stocks are instead well below the estimated thresholds needed for decent living standards.

This gives contraction and convergence a concrete form: build more where capabilities are lacking; stop accumulating stocks beyond needs where they are already overabundant. The same article shows that if currently under-equipped countries reproduce the overaccumulation trajectories of rich economies, global material requirements could become several times larger.

But the physical result does not solve international politics. Who finances the infrastructure? Who owns the technologies? Should countries in the South limit exports to preserve their resources? Could lower demand in the North also eliminate necessary income and jobs in exporting economies?

Degrowth therefore has to show more than a smaller northern footprint. It has to be compatible with financial, material, technological, and economic arrangements that genuinely expand human capabilities elsewhere.

9. Trade, Geopolitics, and State Capacity

Security shocks can change priorities quickly. War, energy disruption, sanctions, or broken supply chains may make some productive capacity more valuable than a peacetime plan expected. Resilience has to be treated as an explicit trade-off, not as a universal excuse for permanent overcapacity.

A post-growth economy remains embedded in global prices, exchange rates, supply chains, industrial policy, and geopolitical conflict. Deliberately reducing domestic production can raise dependence on imports; reshoring can raise costs and material demand for a time.

Trade rules can also shift rather than solve environmental pressure. Product standards, border adjustments, and traceability requirements need administrative capacity and credible data. A theory that expands collective coordination also has to confront the informational and capture risks of the state doing more.

Administrative capacity creates its own risks. States can be captured, centralize too much information, overcommit to one technology, or protect inefficient industries. A credible post-growth theory needs oversight, transparency, evaluation, and institutional competition that make those errors correctable.

A national program can succeed statistically and fail physically by importing what it no longer produces. The only way to detect this illusion is to track consumption footprints and supply chains.

The instruments exist in theory: content standards, carbon border adjustments, traceability rules, industrial agreements, and taxes on certain materials. But each creates measurement problems, opportunities for circumvention, and trade conflicts.

Geopolitics adds another uncertainty. Transition technologies depend on concentrated supplies of metals, components, and logistics chains. A sufficiency strategy reduces some needs and can therefore improve resilience; but electrification and the construction of new infrastructure may temporarily increase dependence on certain materials.

Finally, our program assumes a capable state. Measuring, planning, regulating credit, administering services, organizing compensation, monitoring imports, and experimenting with policies require competent institutions. Administrative capacity is not a detail.

This objection is particularly strong because part of the post-growth literature specifically criticizes markets that coordinate externalities and needs poorly. The natural response is to give more functions to collective decision-making. But each new function also creates information requirements, discretionary power, and opportunities for capture.

The principle of subsidiarity can limit the problem. A national emissions cap can be centralized while the choice of local arrangements for meeting it remains local. A technical standard can specify an outcome without prescribing every process. A market can continue allocating goods within an ecological cap. A company can decide how to organize itself under rules governing responsibility and durability.

Degrowth is more credible when it specifies what must be planned and what can remain decentralized. The more a proposal assumes that a central authority knows local preferences, technologies, and costs, the more it must demonstrate why that information cannot be handled better by other institutions.

A realistic theory has to anticipate state failure as seriously as market failure. Local information should often remain local. Markets that coordinate dispersed choices effectively under clear ecological constraints do not need to be abolished. Planning is strongest where coordination,

long-term investment, or compliance with shared limits genuinely require it.

10. The Problem of Time: Move Fast Enough Without Breaking the Transition

Ecological time and political time do not line up. Transition costs arrive quickly; many benefits take years to become visible. Durable institutions help, but they cannot become mechanisms for removing policy from democratic revision.

Implementation time matters too. A carbon budget can demand rapid reductions while worker training, transmission lines, housing retrofits, or regional redevelopment take years.

Different sectors therefore need different clocks. Efficiency standards can move quickly when technology already exists. Power systems require coordinated generation, grids, storage, and demand. Care systems depend on workers who cannot be trained overnight.

Revision must not mean permanent postponement. Intermediate milestones, observable thresholds, and automatic mechanisms can preserve direction while allowing adaptation. The challenge is to make the timetable firm enough to guide investment and open enough to incorporate new information.

We have defended sequencing: build alternatives before certain bans, train before closing, experiment where possible. But the climate imposes a constraint on that prudence. The longer action is delayed, the faster future reductions must become.

This can create a conflict between two virtues of the program. A slow transition protects social adaptation but may overshoot ecological budgets. A brutal transition reduces more in the short term but may provoke rejection, shortages, unemployment, or electoral reversal.

No abstract principle resolves this tension. What is needed is a sectoral timetable. Some transformations can follow the natural replacement cycle of equipment. Others require early retirement. Some infrastructure must be built before the constraint; other activities can be prohibited immediately because their harm is high and alternatives already exist.

This tension also requires ranking irreversibilities. Building a fossil-fuel power plant creates lock-in for several decades; delaying a bike lane by six months does not have the same consequence. Closing heating capacity too early before the electrical grid can take over can create a social crisis; immediately banning a new highly carbon-intensive investment can prevent the future problem from being created.

A mature strategy has to weigh the cost of delay against the cost of acceleration. Timing is part of the theory, not an implementation detail added afterward.

So the comparison includes time. A pathway that works beautifully in 2070 but overshoots crucial 2035 constraints is not enough. A technically rapid program that collapses politically after three years may also lose to a slower path that keeps accumulating gains.

11. What Would Make Us Change This Thesis?

These revision conditions are not decorative. Future evidence may make parts of this book obsolete. A speculative technology may become ordinary. A policy assumed to be impossible may work. A constraint may prove more severe than expected.

The deepest test is willingness to lose part of the conclusion. If green growth delivers broad, durable, sufficiently fast reductions in major pressures with stronger human outcomes and less coercion, deliberate volume reduction should become less important. If serious sufficiency policies repeatedly destroy basic capabilities, they should be narrowed or abandoned. If post-growth institutions produce recurring crises that broad expansion genuinely prevented, that dependence has to be acknowledged.

The same openness applies to innovation, politics, and geography. A doctrine that interprets every contradiction as proof that it needs to be applied even more strongly has made itself immune to evidence.

What survives is narrower and stronger: in affluent economies where some material flows, stocks, and forms of consumption substantially exceed what is needed for a decent life, deliberately reducing excessive pressure is a rational way to reduce dependence on future decoupling alone—provided human capabilities are protected, sectors that need to grow are distinguished from those that should contract, institutional stabilizers are rebuilt, and the whole program remains revisable.

That residual claim is closer to a rule of prudence than to a total economic doctrine.

We would weaken the case for contraction if green growth demonstrated, at large scale and over long periods, sufficiently rapid absolute decoupling across the major ecological pressures without simply shifting impacts abroad and while maintaining strong social outcomes.

We would revise a sufficiency policy if lower material use persistently damaged human capabilities despite credible alternatives and serious redistribution.

We would revise post-growth institutions if their implementation systematically produced more unemployment, inflation, or financial instability than plausible alternatives.

We would relax constraints on a sector if they blocked innovation or investment needed for health, adaptation, resilience, or decarbonization.

We would change political instruments that remained durably rejected after clear information, realistic alternatives, compensation where justified, and lived experience of their effects.

We would reject any version of degrowth that asked lower-income countries to forgo material stocks required for decent living standards.

And we would simplify or decentralize policies whose administrative complexity created more error, capture, or cost than ecological or social gain.

What remains is less dramatic than the original slogan, but harder to dismiss: reduce excessive pressure where it is already high; protect and expand basic capabilities where they are missing; stop making essential institutions depend on generalized expansion; and keep the program open to correction as evidence changes.

The vocabulary itself is not sacred. If "degrowth" eventually obscures the fact that some sectors and capabilities have to grow, the term can be narrowed, qualified, or abandoned.

What should survive is the method: begin with needs and limits, follow physical flows, expose costs, test institutions, compare the strongest competing alternatives, and state in advance what would change the conclusion.

That is not historical certainty. It is a political hypothesis precise enough to be tested.

This core is not a historical certainty. It is a political hypothesis that has become precise enough to be tested. The general conclusion should promise no more than that.

Methodological Notes and Limits of the Evidence

- The Savin–van den Bergh review is used for its methodological signal about a self-identified degrowth literature, not as an exhaustive map of all research relevant to post-growth.
- The Krpan et al. public-support findings come from survey experiments; they do not establish a durable electoral majority under real costs.
- Comparative green-growth/post-growth models are conditional on their assumptions. They are tools for comparison, not predictions.
- The Streeck et al. estimates of material stocks required for decent living are exploratory and contain uncertainty about practices, material intensities, and national data.
- The falsifiability matrix identifies evidence that would count against the book's propositions. It does not assume that one isolated result is enough to settle the matter.

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GENERAL CONCLUSION — A Civilization That Knows When to Stop

We began with a simple question: why does a society capable of producing, calculating, and transforming so much seem to have so much trouble saying "enough"?

The answer is not a moral defect in individuals. It is institutional, material, and cultural. We built economies in which rising output makes employment, public revenue, profits, debt service, retirement systems, distributional compromise, and political stability easier. Progress became associated with motion, and motion with expansion. Eventually, not growing stopped looking like one possible condition and started looking like a threat.

That is why degrowth cannot be reduced to telling people to consume less. A population does not leave productivism behind by becoming more virtuous. If housing, mobility, employment, public finance, investment, and social status are still organized around expansion, asking individuals to stop means asking them to resist an architecture that keeps pushing the other way.

But the argument has also eliminated several easy versions of degrowth itself. Nothing in this book establishes that all GDP growth is materially impossible. Interest-bearing debt does not mathematically require infinite expansion. A no-growth economy is not automatically stable. The state is not immune to error. And an ecologically motivated sufficiency program is not automatically democratic.

So the book does not end with one side defeating the other. It ends with a narrower, more conditional thesis—and a stronger one because of it.

1. Learn What to Stop

A civilization that knows when to stop is not a civilization that stands still. It can build, invent, explore, care, learn, create, and transform. What it stops doing is treating more volume as the default answer to every problem.

Sometimes stopping means no longer extracting more when a material stock is already abundant. It means renovating before rebuilding,

repairing before replacing, extending use when that really lowers impact, and sharing where private duplication adds little capability. It can also mean allowing a sector to shrink or disappear when its function can be met another way with less pressure.

But stopping does not mean cutting everything. Under-equipped regions need more housing, clean water, sanitation, electricity, health care, transportation, and education. Rich economies still need new grids, large-scale retrofits, some expanding low-carbon industries, and major climate adaptation. Sufficiency does not mean "less everywhere." It asks: less of what, for what function, in which place, and for whose benefit?

The important divide is not growth versus degrowth in the abstract. It is necessary expansion versus expansion that has become self-perpetuating; capability versus accumulation; service delivered versus volume produced.

2. Break the GDP Reflex

GDP remains useful as a measure of monetary activity. It can register recession, recovery, or rising production. It cannot decide what society should pursue.

Rebuilding after a disaster can raise GDP without making society genuinely richer. Better prevention can reduce medical spending while improving health. Retrofits can reduce energy sales while increasing comfort. Fewer crashes can eliminate repair spending that once counted as economic activity.

There is therefore no reason to seek lower GDP for its own sake. If emissions, extraction, and other pressures fall fast enough while GDP rises, that is not failure. A recession with unemployment, poverty, and underinvestment is not success simply because the aggregate shrinks.

The harder proposition is to remove GDP from its role as an implicit goal. Physical flows, human capabilities, distribution, and resilience become the primary tests. GDP becomes something to interpret afterward.

This may be where the word "degrowth" reaches its own limit. If the term forces us to defend a falling aggregate even when the real objectives are being achieved, then the term has to be clarified—or abandoned. No concept deserves protection at the expense of its function.

3. Wealth Without Endless Accumulation

There is no universal answer to "how much is enough?" in dollars, square feet, or kilowatt-hours. Human needs are relatively stable at the level of broad functions; the systems used to meet them vary enormously.

Housing, mobility, health, security, autonomy, participation, and control over time are not simply quantities of goods. A society can spend more resources and deliver less capability when its institutions are inefficient, unequal, or built around duplicated private spending.

Sufficiency therefore begins with a floor: no one should lose essential capabilities in the name of restraint. It also recognizes collective ceilings where forms of consumption impose shared physical costs. Between the floor and those limits, the widest possible space for plural ways of living should remain.

That architecture is also a safeguard against paternalism. The goal is not to decide which lives are worth living. It is to prevent one model of success from requiring material pressures that other people must absorb.

Wealth then includes more than accumulated objects: time we genuinely control, strong public services, security, relationships, knowledge, participation, and the freedom to pursue projects without converting every aspiration into material expansion.

4. Build an Economy That Does Not Need to Accelerate

The central difficulty is institutional. As long as slower growth threatens employment, retirement systems, public finance, and solvency, deliberately reducing some material flows will remain politically and socially difficult. Reducing that dependence does not guarantee support. It removes some of the automatic penalties that make every slowdown feel like crisis.

The functions currently supplied by expansion have to be supplied another way. Productivity gains can become time instead of only more output. Essential services can depend less on private income. Investment can shift from net accumulation toward renewal, transformation, and maintenance. Firms can remain profitable without permanent expansion. Finance can judge balance sheets and projects instead of assuming that asset values must keep rising.

None of that is free. Shorter hours can squeeze profits. Tax reform can lose revenue. Retirement systems still face demographic constraints. Public investment uses resources that cannot be spent elsewhere. A post-growth economy does not abolish trade-offs; it stops hiding them behind the hope that future growth will give everyone more.

That honesty is part of stability. A program promising less work, more income, more investment, less material use, and no losses has to explain how those pieces fit together. Otherwise degrowth repeats the productivist mistake it criticizes: promising that tomorrow will somehow dissolve today's contradictions.

5. Keep the Transition Democratic

A transformation this large is not legitimate simply because it responds to a physical limit. Ecological constraints are not decided by vote. The means of responding to them are.

Democracy can restrict some uses when their collective harms are well established. But the restriction has to be proportionate, understandable, contestable, and—where possible—paired with real alternatives.

That creates a sequencing rule: build the ability to adapt before or alongside the constraint when ecological time allows. Train before closure. Provide mobility before removing an option. Retrofit before penalizing people who cannot change alone. Experiment when the effects are uncertain and reversible.

It also means acknowledging losers. Some industries, assets, regions, and income streams will decline. Justice does not mean pretending nobody loses. It means distinguishing rents that can legitimately disappear from people and communities that a collective decision cannot simply abandon.

And democracy requires correction. Ineffective ecological policy must be replaceable. Compensation that has hardened into rent must be allowed to end. Better technology must be allowed to change the plan. A majority must be able to challenge the means without being automatically dismissed as ignorant or disloyal.

A transition democratic enough to be corrected may look less pure. It is probably more durable.

6. What We Still Do Not Know

We do not know whether the institutions proposed here can operate together for decades in a large, open economy. Models show possibilities. They do not substitute for future history.

We do not know that green growth must fail. If it demonstrates sufficiently fast and broad absolute decoupling, without shifting impacts elsewhere and while delivering strong social outcomes, part of the case for degrowth will have to be abandoned.

We do not know whether the necessary political coalitions will survive once costs become personal. Recent survey evidence is more encouraging than critics sometimes assume, but stated support is not the same thing as a durable majority after years of implementation.

Nor do we know how to organize contraction in affluent economies so that it genuinely expands development possibilities elsewhere rather than simply reducing income in export-dependent regions. Material convergence requires new infrastructure where it is missing, which means finance, technology, and real productive space.

Those unknowns do not make action impossible. They rule out certainty.

The strongest program is not the one that claims to have solved every question. It is the one that says what it is testing, measures what happens, and changes its means when the results contradict its expectations.

7. Growth as a Possibility, Not an Obligation

The deepest change proposed by this book can now be stated simply.

The problem is not that an economy grows. The problem is that it cannot function without growing.

An autonomous society should be able to pass through growth, stagnation, or contraction without treating each movement as either a moral verdict or an institutional emergency. It should be able to let a useful sector expand, manage the decline of another, invest heavily where capabilities are missing, and reduce flows where accumulation no longer serves a function.

Moving beyond productivism therefore means regaining collective freedom in relation to growth itself: no longer needing the number to be

positive every year, no longer inventing additional consumption simply to keep chosen institutions stable.

That is a more demanding form of economic autonomy than prosperity alone. It requires institutions capable of saying yes to expansion when it serves a function, no when it destroys more than it provides, and enough when the relevant capability has actually been secured.

8. A Civilization That Knows When to Stop

Knowing when to stop is an unusual skill for a technological civilization. We know how to accelerate, optimize, extract, transport, automate, and calculate. We are much less practiced at recognizing when an additional unit stops adding much to the quality of a life.

Stopping does not mean giving up desire, invention, or the future. It means refusing to confuse the future with an indefinitely rising flow.

A mature forest is not a failure because its area does not expand every year. A library does not fail once it has enough copies of a book. A house is not in crisis because it stops adding rooms. A society might learn the same lesson: some quantities are means that should grow until they have done their job.

Economic maturity might then be defined less by the capacity to produce more every year than by the capacity to distinguish what still needs to grow, what can endure, and what should stop.

This is not a promise of a perfect society. It guarantees neither harmony nor automatic abundance nor the end of conflict. It offers a discipline: begin with needs and limits; follow real flows; expose costs; protect essential capabilities; test institutions; compare competing alternatives in their strongest form; and say what evidence would change the conclusion.

If that discipline still deserves the name degrowth, then degrowth is not the art of becoming less. It is the collective practice of learning what no longer needs to become more.

Perhaps a civilization becomes mature when it can see a real opportunity to expand, know that it could take it, and still choose to say: enough.

ABOUT NOOSOPHY

Noosophy begins with a simple distinction: reality does not depend on what we believe about it. An idea can be persuasive and still be false. A tradition can contain useful intuitions and errors. A scientific theory can be exceptionally strong while remaining limited to a particular domain. Our understanding changes; what we seek to understand is not reducible to our representations of it.

Within the noosophical project, the word "Noosophy" refers to truth or the structure of reality independently of the way human beings understand it. We do not claim to possess that truth in its entirety. Texts, concepts, institutions, and people working under this name offer only partial, debatable, and revisable understandings.

Noosophical work therefore means seeking more seriously: distinguishing what is known from what is assumed, comparing different explanations, examining contradictions, looking at available facts, recognizing uncertainty, and correcting an idea when it does not withstand examination.

This search is not confined to one field. Science can illuminate some questions, philosophy can clarify concepts, history can show how ideas formed, the arts can reveal other dimensions of experience, spiritual traditions can offer interpretations that must be understood before they are evaluated, and practical activity can show what ideas become when we try to apply them.

Connecting these domains does not mean mixing everything together. Noosophy does not assume that all opinions are equal or that every tradition necessarily contains part of the truth. Incompatible claims do not become true merely because we would like to reconcile them. Integration can also mean preserving a difference, contradiction, or uncertainty when it cannot honestly be resolved.

This way of seeking naturally crosses the boundary between theory and practice. When an idea can be tested in action, consequences become a source of learning: understand, act at the relevant level, observe what reality returns, correct, and integrate again. An elegant theory is not treated as proof of its own value.

The noosophical movement brings together people and structures that wish to take part consciously in this work of understanding and transformation. It does not require adherence to a fixed list of beliefs. It seeks more rigorous ways of thinking, learning, debating, producing, transmitting, and acting when our knowledge allows us to do better.

Books published by Éditions Noosophie can therefore address very different subjects: agriculture, ecology, economics, politics, consumption, ways of life, artificial intelligence, spirituality, culture, technology, or collective organization. Each book explores a particular problem with its own sources and constraints while participating in a broader search: understand reality better, connect what can be connected without erasing differences, and accept changing our ideas and practices when confrontation with reality requires it.

Noosophy itself should not be confused with a book, an author, an association, a software system, or a corpus. These are human and technical means of research, transmission, and experimentation. They can be corrected, replaced, or surpassed.

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HOW THIS BOOK WAS PRODUCED

The production of this book took place through successive stages rather than through the automatic generation of a complete text. The subject, objectives, and general directions were first defined through human decisions. Noosophy AI then helped explore the subject, research and compare sources, develop possible architectures, and surface arguments, objections, and areas of uncertainty.

The manuscript was developed progressively, chapter by chapter. Proposals were reviewed, discussed, corrected, or rejected when they did not fit the project, contained insufficiently supported claims, or simplified the subject too far. Separate phases of documentary research, drafting, criticism, coherence checking, adaptation, and assembly were used when necessary.

Artificial intelligence is not treated here as a source of authority. It functions as an active tool for research, formulation, comparison, and testing. Its proposals can be wrong and remain revisable.

The published version results from this iterative work, successive corrections, and final human validation. The method aims to use the capacities of artificial intelligence without transferring to it decisions about the purpose of the book, value choices, or the decision to publish.

ABOUT HIERONYMUS ANONYMUS

Hieronymus Anonymus is the human initiator of the Integrative Noosophy project. His work focuses on connecting fields of knowledge and practice that are usually separated, and on experimenting with new forms of collaboration between humans and artificial intelligence. He participates in the conception, discussion, revision, and validation of works published by Éditions Noosophie.

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Author credit: Noosophy AI
under the direction of Hieronymus Anonymus
Publisher: Éditions Noosophie
Current publishing entity: Association Noosophie

ISBN: To be assigned
Legal deposit: Pending publication
Contact: contact@noosophie.fr
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WHAT IF PROGRESS LEARNED TO SAY "ENOUGH"?

Modern societies have learned to treat growth as a normal condition of jobs, public finance, investment, and political stability. But what happens when expansion becomes an institutional necessity rather than a means to human ends?

This manifesto examines how the drive for more became normal, why we desire it, which institutions depend on it, and what this arrangement actually produces. It then tests the promise of green growth against material limits, inequality, and power before exploring an economy of enough: protecting essential capabilities, reducing excess pressures, redesigning infrastructure, and building institutions that can function without permanent expansion.

The degrowth defended here is neither recession as a project nor a morality of deprivation. It is a revisable political hypothesis: distinguish what still needs to grow, what can endure, and what should stop - without sacrificing democracy, justice, or the possibility of changing course.

THE BOOK PUTS FOUR QUESTIONS TO THE TEST:

- Why did growth become a political obligation?
- Can material throughput fall without reducing human capabilities?
- What institutions could make a post-growth economy stable and democratic?
- What would genuinely count as evidence against this thesis?

Degrowth is not the art of becoming less. It is the collective learning of what no longer needs to become more.

AUTHOR	Noosophy AI
DIRECTION	Hieronymus Anonymus
EDITION	First U.S. English edition - September 2026
PUBLISHER	Éditions Noosophie / Association Noosophie
DISTRIBUTION	Free - noosophie.fr