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THACKARA

HOW TO THRIVE IN THE NEXT ECONOMY



CHANGING



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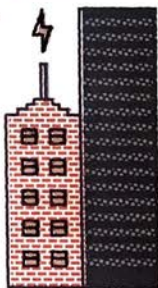
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MOVING



John Thackara

HOW TO THRIVE IN
**THE NEXT
ECONOMY**

**DESIGNING TOMORROW'S
WORLD TODAY**



Thames & Hudson

CHANGING: FROM DO LESS HARM, TO LEAVE THINGS BETTER

At a dusty crossing on the long cross-country road from Kanpur to Lucknow, in Uttar Pradesh, India, we come across a huge video screen on the back of a flat-bed truck. Together with a dozen villagers, four people on bicycles, and a cow, we stare in a daze at the screen. On the left side of the screen the landscape on each side of the River Ganges, in whose vast fertile plain we are standing, is made to look hot, dusty, and wretched. On the right of the screen, a better future is portrayed: busy cities, robot assembly lines, and high-speed trains. This before-and-after sequence is followed by a full-screen video in which computer-generated apartment blocks sprout like so many mushrooms from bright green grass along the banks of the River Ganges. 'Welcome to Trans-Ganga HighTech City,' explains the voiceover.

'May the odds be ever in your favour!' mutters my young companion. 'This is pure *Hunger Games*,' she explains, and goes on to describe how, in a film that everyone in the world has seen except me, a young woman called Katniss lives in a dystopian, post-apocalyptic nation. Every year The Capitol, where the rich people live, asserts its power over the poor regions that surround it by staging the Hunger Games in which boys and girls, selected by lottery from the poor

areas, compete in a televised battle to the death. 'May the odds be ever in your favour!', I learn, is what the creepy ruler guy says when opening the Games – in which all but one competitor will die.

Trans-Ganga HighTech City resembles *The Hunger Games* all too well – a glossy, gated city surrounded by social hardship and degraded landscapes. Trans-Ganga is one of 100 Indian turn-key cities that developers want to build on green land swept clean of its small farmers and biodiversity. Investors are promised that special laws will be passed to ensure that millions of poor Indians are 'excluded from the privileges of such great infrastructure.' These physical and social impacts are disturbing enough – but what really cranks up the anxiety level are the bright and perky voices, on screens everywhere, proclaiming these developments to be for the good of all. Whenever a voice is raised in protest at the negative impacts of these plans, the perky heads blame the losers for their own misfortune: Get a job! Try harder! May the odds be ever in your favour!

The words we choose are important as we try to make sense of these new times. One man's *energy descent* is another woman's *energy transition*. Talk of an *impending crisis* is scary; realizing that the crisis is already underway, less so. The *end of growth* sounds grim – but it is not the *end of life*. The *collapse of civilization* is a terrifying prospect; *the birth of a new one* puts things in a different light. 'What is civilizational collapse, after all,' quips the Italian physicist Ugo Bardi, a self-styled 'stoic scientist', 'other than a period in which things are changing faster than usual?'

The apocalyptic view is couched in the language of danger and collapse. Industrial civilization has started to crash, say the 'doomers'. For them, our best course of action is to head for the hills with a truckload of guns and peanut butter. At the other extreme, optimistic technology buffs are confident that man-made solutions will soon allow us to carry on as usual. And what about the rest of us? Most people I know are anxious about what's happening around them, but silently so; they think less about the collapse of civilizations than with finding work, or feeding their kids. But they – we – feel less and less secure. It doesn't help that the media are filled with fatuous advice

about what we should do: drive a Tesla? Change a light bulb? Give us a break.

This book is that break. It tells of a third social movement – much bigger than the rifle-packing doomers and the green-tech dreamers – that's emerging as the global crisis unfolds. This movement is below the radar of mainstream media, but it contains a million active groups – and rising. Quietly, for the most part, communities the world over are growing a replacement economy from the ground up. As you will read in the pages that follow, their number includes energy angels, wind wizards, and watershed managers. There are bioregional planners, ecological historians, and citizen foresters. Alongside dam removers, river restorers, and rain harvesters, there are urban farmers, seed bankers, and master conservers. You'll meet building dismantlers, office-block refurbishers, and barn raisers. There are natural painters, and green plumbers. There are trailer-park renewers, and land-share brokers. The movement involves computer recyclers, hardware re-mixers, and textile upcyclers. It extends to local currency designers. There are community doctors. And elder carers. And ecological teachers.

For most of the people I write about in this book, the changes they are making are driven by necessity; they are not a lifestyle choice. Few of them are fighting directly for political power, or standing for election. They cluster, instead, under the umbrella of a social and solidarity economy. Different groups and movements have names like Transition Towns, Shareable, Peer to Peer, Degrowth, or *Buen Vivir*. Their number includes FabLabs, hacker spaces, and the maker movement. Some have taken over neglected buildings – from castles and car parks, to ports, piers, hospitals, and former military sites. There are campaigning organizations, too – for slow food, the rights of nature, and seed saving – not to mention bioregionalism, and commoning. And our number is growing. Up to 12 per cent of economically active citizens in Sweden, Belgium, France, Holland, and Italy work in some kind of social enterprise – and that's in addition to the vast amounts of unpaid work already being done in the household and caring economy.

Although these projects are wondrously diverse they are all, for the Spanish writer Amador Fernández-Savater, 'message-bearers of a new story of the world'.³ A green thread runs through this story: a growing recognition that our lives are codependent with the plants, animals, air, water, and soils that surround us. The philosopher Joanna Macy describes the appearance of this new story as the 'Great Turning' – a profound shift in our perception of who we are, and a reawakening to the fact that we are not separate from the Earth as a complex of living systems.⁴ From sub-microscopic viruses, to the vast subsoil networks that support trees, this new story goes, the entire Earth is animated by complex interactions between its life forms, rocks, atmosphere, and water. Explained in this way – by science, as much as by philosophy – the Earth no longer looks like a repository of inert resources. On the contrary: healthy soils, living systems, and the ways we can help them regenerate supply the 'why' of economic activity that's missing from the mainstream story. The one kind of growth that makes sense, in this new story, is the regeneration of life on Earth.

The notion of a living economy can sound poetic, but vague. Where, you may ask, is its manifesto? Who is in charge? These are old-fashioned questions. The account given by Macy – of a quietly unfolding transformation – is consistent with the way scientists, too, explain how complex systems change. By their account, a variety of changes, interventions, and disruptions accumulate across time until the system reaches a tipping point: then, at a moment that cannot be predicted, a small release of energy triggers a much larger release, or phase shift, and the system as a whole transforms. Sustainability, in other words, is not something to be engineered, or demanded from politicians; it's a condition that emerges through incremental as well as abrupt change at many different scales. 'All the great transformations have been unthinkable until they actually came to pass,' confirms the French philosopher Edgar Morin. 'The fact that a belief system is deeply rooted does not mean it cannot change.'⁵

So this is an optimistic book – but not dreamily so. If I'm to convince you that the stories to come are the harbinger of the new

economy we so desperately need, I first need to explore the powerful but hidden reasons that a return to normal is just not going to happen.

ENERGY

In 1971 a geologist called Earl Cook evaluated the amount of energy 'captured from the environment' in different economic systems.⁸ Cook discovered that a modern city dweller needed about 230,000 kilocalories per day to keep body and soul together. This compared starkly to a hunter-gatherer, ten thousand years earlier, who needed about 5,000 kcal per day to get by. That gap, between simple and complex lives, has widened at an accelerating rate since 1971. Once all the systems, networks, and gadgets of modern life are factored in – the cars, planes, factories, buildings, infrastructure, heating, cooling, lighting, food, water, hospitals, information systems, and their attendant gadgets – well, a New Yorker or Londoner today 'needs' about *sixty times* more energy and resources per person than a hunter-gatherer. To put it another way: American citizens today use more energy and physical resources in a month than our great-grandparents used during their whole lifetime.

This upwards trajectory would be alarming if we thought about it clearly – but we don't. We simply ignore the fact that all these 'needs' depend on growing flows of cheap and intense energy. Belief is one thing; basic mathematics, and the laws of physics, suggest otherwise. The exponential growth of anything tangible, or energy consuming, cannot continue indefinitely in a finite universe. As Tom Murphy, an American physics professor, patiently explains, even if the future rate of compound energy growth in our economy declined to a lower level than today, we'd still see an increase by a factor of 10 every 100 years; in 275 years, we'd reach 600 times our current rates of use. Surely, you may counter, economic growth could be decoupled from energy growth and be freed to expand to infinity that way? Well, no. Multiplying money *always* expands an economy's physical impacts on the Earth. 'Energy is the capacity to do work; it's the lifeblood of activity,' explains Professor Murphy. 'Think it through: to keep GDP growing indefinitely on a fixed energy diet would mean that anything

requiring energy becomes an ever-smaller part of GDP, until it carries negligible value. But food, heat, and clothing will never be negligible needs. There is plenty of scope for economic activities that use *less* energy – but that is not the same as reducing energy intensity to zero.⁷ Indefinite GDP growth is Not Going to Happen.

The world is not in danger of running completely out of energy – in the short or even medium term. Strictly speaking, we don't face an energy crisis so much as an *exergy* crisis – that is, a shortage of energy that is so highly concentrated, and easy to obtain, that it can easily be used to drive the economy. At its most dynamic, the thermo-industrial economy grew using oil that, if it did not literally gush out of the ground, was easily extracted using oil-powered machines. Since then, we've burned our way through the easy-to-access fuels and extracting energy gets harder and more expensive every year. To make matters worse, the man-made world has become so much more complicated – think of all those computer networks, aviation systems, and fancy hospitals – that it now takes far more energy just to keep 'the system' going than would have been needed, just a generation ago, to deliver a simple but effective product or service to you and me.

For an explanation of where these trends are taking us I went to the Houses of Parliament in London. An American ecology professor, Charles Hall, had been invited to give a lecture on Energy Return on Energy Invested (EROEI). The central principle of EROEI, he explained, is that it takes energy to obtain energy – and if that process takes too much effort, and therefore cost, then the needed investment probably won't be made – and the energy needed to run the system won't be available. Prof Hall showed us the change, through time, of the number of barrels of oil obtained for use in the economy for every barrel invested in extraction:

1930s 100 barrels for economic use

1970s 25 barrels

1990s 15 barrels

Most of the energy solutions being trumpeted today, Hall continued – from tar sands in Alberta to solar arrays in Spain – fall well below

the 15:1 threshold below which the investment never pays for itself. 'You can't have an economy without energy. Energy does the work!' Professor Hall concluded, echoing Tom Murphy's 'poor-quality fuels mean poor-quality growth'. I'll never forget the silence that followed his presentation. Eventually, a senior Member of Parliament stood up, thanked Professor Hall for his 'most interesting presentation', and added, 'but of course, for an elected politician, reduced affluence is an impossible sell'. He then sat down. Professor Hall, the scientist, said he was a numbers guy, not a policy guy – and he sat down, too. Then everybody went home.

Technology optimists believe that renewable energy, conjured into existence by innovation, will allow us to carry on as usual – but they are in for a disappointment. Nearly all plans for a transition to renewable energy suffer from an existential flaw: they take global energy 'needs' as a given, calculate the quantity of renewable energy sources needed to meet them, and then – well, things get vague. Green energy optimists have no answer for a logical inconvenience: it takes astronomical amounts of fossil-fuel energy, and money, to deploy 'green' energy systems – 200 km (125 miles) of copper in one wind turbine, to give just one example. There would be far fewer wind turbines, for example, if they had to be manufactured, installed, and maintained using wind energy. Retrofitting energy systems on a large enough scale to run today's industrial society would require vast investment of materials, money, and organizational effort that, in today's deflationary global crisis, will not be available. Gail Tverberg, an actuary and blogger, puts it bluntly: 'Quite apart from the math, or the thermodynamics, or the simple logic, a lack of cash flow for investment in infrastructure will eventually bring the system down.'

Measured against the laws of mathematics, physics, and common sense, our belief in an energy-intense economy – one that expands to infinity in a finite world – seems irrational. A better word would be *habitual*. Many smart people believe that growth will go on forever because that is all they have known in their lives. They believe in the inevitability of progress because, in their lives at least, things have always progressed. They believe that bold actions should be

taken without regard for consequences because there haven't been any negative consequences – or rather, none that they have experienced personally. They believe that man is special, and that progress is unstoppable, because no experience has given them reason to think otherwise. These foundation myths of the modern age – reason, progress, mastery over nature – are oil-powered narratives. In the 1950s, when Milton Friedman expounded the economic thinking that dominates political discourse to this day, you could buy a barrel of oil for US\$3.50.

MONEY

The timing and severity of peak energy is a contested topic, but a growing number of people are happy to blame bankers for our economic woes. This blame is misdirected. The men and women in suits can be hard to love, it's true, but they are more the prisoners of a dysfunctional system than its masters – in their case, the money one. And the fate of the money system, it turns out, is tied intimately to the fate of the energy one. Money and energy are better thought of as one story.

Before writing this book, I had vaguely assumed that what banks do is collect deposits and savings from one lot of people, and lend those funds out to different people in the form of loans, mortgages, and credit on plastic cards. This is not the case at all. Although bankers describe their core business as 'lending' money, it should really be described as *creating* money. When you or I borrow money from a bank, and the bank tells you it is 'transferring' funds into your account, that money is not taken out of a vault, nor even sent down a wire from somewhere else. It is newly created, there and then. Only a small fraction of the money they create is backed up by assets – such as the deeds to a house, or a bar of gold – lodged safely in their vaults. For the most part, they just make the loan at will. And it gets curiouiser. Even though you and I now have new money to spend, these loans are recorded on the banks' balance sheets as assets. The rationale seems to be that the interest on the loan that you and I will pay to the bank represents a steady flow of profit

to them. And because many bankers are paid by commissions on new loans issued, there's a built-in incentive to lend as much as possible.

When an economy is growing, this peculiar dynamic does not much matter: as people buy more goods, often using credit from the bank, and as businesses take out loans to increase their production of goods, then interest on existing loans is repaid. But when economic growth stalls – for example, because there is less cheap energy to power growth – new money stops entering the system and a destructive feedback loop kicks in. Interest on existing loans is not paid; defaults multiply; jobs are lost; people spend less money; businesses take out fewer loans; less new money enters the economy – and the crisis of debt intensifies.

This through-the-looking-glass logic of the money system is made harder to grasp by the ineffable numbers used to describe it. At the time of writing, global debt is estimated to be about US\$200 trillion – but what does such a number mean? Well, think of it this way: imagine that a world government, burdened with this debt of \$200 trillion, decided to pay it all back at a rate of \$1 per second. To pay back \$1 million at such a rate would take 11.5 days; paying back \$1 billion would take 32 years; but to pay back the full \$200 trillion, at a rate of \$1 per second, would take 6.5 million years.⁹ Taken together with the energy crunch this is why, however much we might wish things to carry on as before, they won't. They can't. As explained by Gail Tverberg, 'An infinite economic growth model has created the need to keep the hamster wheel turning faster and faster until the hamster dies.'¹⁰ Blaming bankers for the hamster's imminent demise is therefore to miss the point; it's the money-energy system itself that is spinning the wheel.

GROWTH

If the manic striving for growth was just about numbers, we could write it off as deluded, but harmless, thinking. But money is not just an abstraction. As professors Murphy and Hall explained above, money gets work done in the real world. When a system must grow in order

to survive, but the work it enables is destructive, the consequences are catastrophic.

I experienced the grim consequence of growth for its own sake at a meeting of 200 sustainability managers at a famous home furnishing giant in Sweden. During twenty years of hard work on sustainability, this company has made thousands of rigorously tested improvements; these are recorded on a 'list without end'. The range of improvements is startling – even admirable – except for one fact: the one thing this huge company has *not* done is question whether it should grow. On the contrary: it is committed to double in size by 2020. By that date, the number of customers visiting its giant sheds will increase from 650 million a year at the time of writing to *1.5 billion* a year. And why? The senior manager who briefed our meeting on this plan put this growth into context: 'Growth is needed', she explained, 'to finance the sustainability improvements we all want to make.'

A fatal flaw with this argument is best explained if I talk about wood. The company, as the third largest user of wood in the world, has promised that by 2017 half of all the wood it uses – up from 17 per cent now – will either be recycled or come from forests that are responsibly managed. Now 50 per cent is a vast improvement on 17, but it also begs the question: what about the *other* half of all that wood? As the company doubles in size, that second pile of wood – the *un*-certified half, the unreliably-sourced-at-best half – will soon be twice as big as *all* the wood it uses today. The impact on the world's forests, of this one company's hunger for resources, will be appalling. The committed and gifted people I met in Sweden – along with sustainability teams in hundreds of the world's major companies – are confronted by an awful dilemma: however hard they work, however many leaks they plug in production cycles, the net negative impact of their firm's activities on the world's living systems will be greater in the years ahead than it is today. And all because of compound growth. It doesn't matter how many brands proclaim that their products are verified, accredited, or certified as being sustainable; so long as growth remains a company's prime

directive, any promise to leave the world 'as unspoilt as possible' will remain an empty one.

If a lack of data were the main problem, help would be at hand. Following a large international effort, a set of accounting tools known as The Economics of Ecosystems and Biodiversity (TEEB) puts a price on the services provided to industry by nature; and many governments and companies have signed up to its framework.¹¹ Unfortunately, TEEB has only made things worse. The theory was that knowing the value of ecosystems would cause companies to look after them better – but TEEB's numbers, acting like blood in the water, have also attracted the attention of predatory investors. Living systems – watersheds, minerals, food, and land – are now being converted into 'financialized' assets which, having been rendered abstract, have become new tokens for speculation.¹² By design, these financial products contain powerful incentives for their owners to 'sweat' the underlying assets at an accelerating rate. This commodification of nature has spawned a related but no less baleful phenomenon called 'biodiversity offsetting'. This is the idea that the destruction of an ecosystem by mining, greenfield development, or a large infrastructure project can be 'offset' by the creation of a new patch of nature somewhere else.¹³ This scheme is great for the companies digging the mines or pouring the concrete; it also creates new work for an army of intermediaries; but the result on the ground is an acceleration of environmental destruction. Nature is unique and complex. Some ecosystems take hundreds of years to reach their current state. The promise that the habitat can be recreated at will is another false one.¹⁴

RISK

None of the grim trends I've described above is doomer speculation. Lloyds of London, the epicentre of global risk management, has warned that 'an oil supply crunch is likely in the short-to-medium term'. For another capitalist hotspot, the World Economic Forum (WEF), peak oil is just one item in a guide to possible futures called 'Seeds of Dystopia'. Highlights of this jolly survey include a killer

virus pandemic; unmanageable deflation; a geomagnetic storm that wipes out the internet; global food shortages; and 'unprecedented geophysical destruction'.¹⁵ These top-trending risks, says the WEF, 'are a health warning regarding our most critical systems'. The WEF is not alone in its sombre outlook. What its *Global Risks* does for the economy, *Global Trends 2030* does for geopolitics and security.¹⁶ The latter report, published by the US National Intelligence Council, warns that 'we are at a critical juncture in human history...natural disasters might cause governments to collapse'. Climate scientists and ecologists reinforce these warnings. The Stockholm Resilience Centre (SRC), for example, has delineated nine 'planetary boundaries' – the limits, for essential planetary living systems, beyond which we must not go.¹⁷ The SRC's map is alarming enough – we are already beyond the red line on three of its nine systems – but it only plots the *known* risks. Even more alarming is the possibility of a so-called 'ecological surprise' – a transformational change, in one or more natural or man-made systems, that could be sudden, non-linear, and catastrophic. As complex systems researcher Noah Raford explains it, too much interconnectivity makes systems vulnerable to 'phase transition' – a word that sounds more benign than it probably is. When a system reaches a critical state, Raford explains, 'even a tiny change can lead to massive fluctuation and collapse'.¹⁸ We know these events can happen, but we don't know when; they cannot be predicted.

All this is meat and drink to the doomer community – but not everyone agrees that we need to take these risks seriously. On the contrary: trends that signal 'risk' to you or me are embraced by others as opportunities. For some tech boosters, the increased interdependency of systems is good news; it signifies that our economy is in an 'evolutionary uplift' towards a 'post-productive' mode.¹⁹ Boundaries and limits are also anathema to the WEF; risks are described in its doom-filled reports as 'transformational opportunities' that we should grab with relish to 'improve the state of the world' and to pursue the 'critical goal...of future growth'.²⁰ There is no acknowledgment – not a word – that compound economic growth could possibly be the cause of these biosphere-threatening trends.

As for the fact that exponential economic growth on a physical planet contravenes basic laws of physics and mathematics²¹ – that, too, is simply ignored.

This is not to deny that resilience – ‘the capacity to bounce back’ as one book²² so well explains it – is a desirable condition. The trouble is that a lot of people perceive resilience – dynamic or otherwise – to be a new variety of risk management that affords them the opportunity to carry on with business as usual. ‘We can’t avoid shocks in an increasingly complex world,’ said one commentator, ‘we can only build better shock absorbers.’ This metaphor would just about work if the world around us were indeed a tarmac road disfigured by potholes – but it’s not. Those ‘bumps’ we’re driving over are better understood as the bodies, metaphorical or otherwise, of living systems.

METABOLIC RIFT

Why would anyone even *consider* driving over them? These powerful individuals are not stupid – so why do they believe so strongly in an ecocidal system? The explanation that works best for me is the existence of a ‘metabolic rift’ between man and the Earth. This is the idea that a combination of paved surfaces and pervasive media have rendered us cognitively blind to the health of the living systems of which we are a part.²³ As Timothy Morton so memorably puts it, a good way to think about the metabolic rift is that ‘the ecological catastrophe has already occurred’.²⁴

Can the metabolic rift be healed? In his 1962 book *The Structure of Scientific Revolutions* Thomas Kuhn introduced the term ‘paradigm shift’ to describe the ways that scientific worldviews periodically undergo radical change in what appears at the time to be a sudden leap.²⁵ These ‘sudden’ paradigm shifts in worldview follow years, sometimes decades, in which scientists have encountered anomalies that don’t fit in with the dominant paradigm. Could a paradigm shift in our understanding of ‘progress’ and ‘the economy’ be imminent? Are there grounds for optimism that the modernist myth – that the biosphere is a repository of resources to fuel endless growth – will be supplanted by something new?

In the chapters that follow I propose that a new story is indeed emerging. This new story describes an economy based on social energy, using 5 per cent of today's resources, that is not only feasible but will leave the world a better place. This story is not about an imagined future utopia; it's based on actions being taken today that are enabling this new narrative to emerge. According to the German Advisory Council on Global Change (WGBU), the heavyweight scientific body that advises the German Federal Government on 'Earth System Megatrends', a 'global transformation of values' along these lines has already begun.²⁶ This post-materialist thinking is not limited to rich-world greens. In South Korea, Mexico, Brazil, India, and China, the WGBU found, a significant majority 'supports ambitious climate protection measures' and would 'welcome a new economic system' to achieve that.²⁷ Although the values described by the WGBU are 'latent' – and numerous laws, and institutional inertia, remain an obstacle – its conclusion is that political and social change on the ground is real, and growing.

This raises an interesting question: if profound paradigm shifts are possible in the worldviews of science; if 'ecological surprises' can transform natural systems, as scientists have shown; and if today's monolithic states could be transformed by 'multi-polarization', as military think tanks predict; in that case, it is surely on the cards that a profound phase shift in *cultural* belief systems is un-paving the way for something entirely new. There's a cheering consequence of this scenario. If, in an age of networks, even the smallest actions can contribute to transformation of the system as a whole, then our passionate but puny efforts so far may not have been in vain. It's like the picture in a jigsaw puzzle that slowly emerges as we add each piece.

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CHAPTER 1: CHANGING

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CHAPTER 2: GROUNDING

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