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GROUND RULES FOR THE 21ST CENTURY
Chapter 24

THE BUSINESS OF SAVING THE EARTH

It can be almost paralyzing to consider how much change we will need to go through in the coming decades. The shift away from fossil fuels is one of the major items on the global agenda. When you look closer, it's amazing just how dependent we are on oil, gas and coal.

When plants grow, they absorb carbon dioxide (CO₂) from the air. They use the carbon to form biomass like wood, stems or leaves, and they exhale the oxygen at the benefit of humans and animals. The fossil fuels in the ground consist of the biomass that has been deposited in the soil through hundreds of millions of years. When we extract the fuels and burn them, the carbon that the plants once bound reacts with oxygen in the air, forming CO₂ - which in this way gets re-leased into the atmosphere.

It's quite substantial amounts of CO₂ that would otherwise be bound in the ground, which are now released into the atmosphere instead. Our consumption of fossil fuels is so great, that in one year we release as much CO₂ as it has taken a million years to deposit. It's hardly surprising that a sustained release of that magnitude changes the atmospheric composition significantly.

In big, round numbers, the total global CO₂ emissions are approx. 50 billion tons annually. It's a commonly used estimate that if the average rise in temperature shall be kept at two degrees by 2100, CO₂ emissions would have to fall below 20 billion tons annually by 2050 – although many scientists would argue that we would need even further reductions.

By 2050 the UN expects that there will be 9.6 billion people living on the planet. This implies, again in big, round figures, a maximum emission pr. person on the planet of two tons of CO₂ annually - roughly equivalent to the emissions of an average Egyptian today. Every Dane currently emits about 11 tons annually; every American around 25 ton, and every Chinese person is now up to about six tons. In the case of Denmark therefore, there would need to be an 80 percent reduction.

If you want to reduce emissions from 50 to 20 billion tons over 35 years, it implies that global emissions must be reduced by 2.4 percent annually. That may sound relatively modest, but the situation currently is that emissions are *growing* year by year, not least because the developing countries are increasing their emissions as quickly as their economy grows - in China's and India's case by eight to ten percent annually. And there is no sign that they will stop the growth any time soon. Measured over several decades, the common expectation is that the global economy will grow by just over three percent annually.

This puts our use of fossil fuels under large and sustained pressure. We must reduce consumption while the economy grows. As the renowned consultancy firm McKinsey says, there must be a substantial increase in *carbon productivity* - that is, how much economic benefit we create pr. unit of CO₂ we emit.

Based on the above figures, McKinsey created a simple projection, which shows that - globally - in 2050, we need to generate ten times more economic value than we do

today for each kg of CO₂ emitted. McKinsey compares the increase in carbon productivity to the increase we have achieved in the productivity of human labor, and it appears that carbon productivity must increase three times as fast as human productivity increased in the US during the booming decades of industrialization.

We are at war

It's a huge transition; technically, economically, culturally and in terms of consumption. We must learn to do without fossil fuels, on a large scale and very quickly. But how? One can relatively easily imagine ways to save 10-20 percent of energy consumption, but from there and to cutting down to a tenth or a fifth of current levels is something entirely different. That requires such great changes, that it is not a question of doing the usual things in a somewhat smarter way. No, we have to come up with completely new ways of getting by.

It could be that most large power plants will have to close, that all electricity production becomes based on renewable energy, that we increase the use of nuclear power, perhaps even develop fusion energy. Maybe petrol cars must be abandoned, just as we have started to abolish incandescent light bulbs. Maybe air travel will become an expensive and rare activity, and we will no longer routinely drive hundreds of kilometers for an ordinary meeting of a few hours. Perhaps it will be too expensive and unacceptable to buy and throw away so much stuff. Maybe we shouldn't *own* so many things, but just pay for having access to use them. Perhaps we will each have a personal quota of CO₂ emissions, and if we can't keep within the limits, we must pay dearly to buy allowances from others who have a little left over on their account. Perhaps those who can afford it will move into dense and super-efficient cities, ensconced behind levees that protect against rising water masses and the rivers of climate refugees ...

As mentioned in Chapter 13, on evolution, the trick for survival is first and foremost to be able to adapt. We are in a situation where there is a clear need for a radical change if humanity is to remain fit for the prevailing circumstances. But mentally, we cling to the logic and the values of growth and prosperity, which we are accustomed to.

Historically, wars served as an opportunity to make a clean sweep and bring about radically new solutions. Hopefully, that won't be necessary to move on to the next phase of humanity's development. Wars demonstrate how flexible we can be when it really counts. The American environmentalist Lester Brown uses the United State's response to the Pearl Harbor attack as an example of the kind of mobilization and transformation he believes is necessary:

For the Americans it came as a complete surprise, when Japanese planes attacked the Pacific naval base Pearl Harbor on 7 December 1941. It only took President Roosevelt a few months to prepare a plan that thoroughly changed the American economy, and which implied that the U.S. went fully into the war. Roosevelt decreed a complete stop for the production of private cars and he rationed goods such as tires, oil and sugar. Simultaneously, car manufacturers and much of the rest of industry were ordered to participate in the production of munitions. From April 1942 to December 1944 the American factories produced 229,000 American airplanes, 5,000 ships and 45,000 tanks - and at the same time it established the technological basis for rapid postwar growth in prosperity.

In late 2008 we saw another example of a quite dramatic action that was decided and

delivered very quickly. Facing the threat of a meltdown of the global financial system President Bush's government turned on a dime and dropped the previous decades' policy of deregulation and minimizing the state. Within a few months stimulus packages worth more than 3.000 billion dollars had been approved and banks, insurance companies and General Motors were nationalized.

The Iraq war is another example of how money can be mobilized if the politicians really want to. Besides the hundreds of thousands of people who have been directly affected, it has been estimated that the war has cost the United States in the order 3000 billion dollars - and it's fair to say that the arguments for the project have been pretty thin, considering the enormous costs.

The law of gravity determines what's easy or hard

The climate and environmental problems are very distant and very close at the same time. They are linked to a style of living that is deeply rooted and reinforced in the very way society works. As an individual it feels almost impossible to make any difference in solving it. Although it will affect each of us directly in the coming years, it is difficult to make the mental connection between the efforts you can make at a personal level and the impact on such a large, global issue.

Suppose you believe in the need for sustainability and are eager to do something about it. Where do you start? If you try to take public transport instead of the car, if you try to make fewer photocopies, or remember to turn off the lights when you leave the room, it often feels like stroking a cat the wrong way: It goes against the grain of the system. We are part of a giant machine that is configured to operate according to a certain logic and at a certain speed, and if you try your hand with a little freelance environmental activism, you just end being a nuisance to yourself, family and colleagues.

We come from a different era in which resources were abundant, and society's priority was to make it easy to use lots of energy and raw materials to create wealth and convenience. Our Infrastructure, the tax system and our legislation are designed so the easiest thing is to spend more. It's almost like a *law of gravity*.

This system locks us in to a type of behavior that is no longer appropriate, and if we want to make a change it will require that we - so to speak - install a new law of gravity. Society's fundamental structures must be designed so they encourage and reward sustainable solutions.

Default: what you get unless you choose otherwise

One of the best sellers in the field of behavioral economics is Richard Thaler and Cass Sunstein's book *Nudge*. In the book, they examine ways to change people's behavior, not through drastic measures, but using small nudges and almost unconscious influences.

One of their methods is to modify the so-called *default* setting of a system. A device that allows the user to choose between a number of options usually has a preset default, a basic setting that the system will use, unless the user chooses otherwise. The system may present the user with several options, but it will recommend one of those options as the "normal" setting. When you install a new software package on your computer, you can often choose to install several different configurations of the program, but there is one option that has already been chosen. If you just press ok, it

will be that setting - the default setting – that's used. And in most cases the user will stick to that option onwards.

Thaler and Sunstein's point is that the way you present the options has a huge influence on what people choose, and therefore the authors encourage a focus on what they call *choice architecture* - in other words, being very conscious of how you communicate choices to the user, but without directly imposing a particular choice.

There are lots of these little nudges in everyday life, where the way we have set up and organized things, gently guides us towards a certain behavior - both positive and negative:

- In many buildings, it is difficult to find the stairs, and you do not feel completely comfortable with where they're going when you enter a stair well. The easiest thing to do is to take the elevator, even just for a single floor.
- In stores, cash registers are set to print out a receipt for each sale. Judging from the many strips of thermal paper lying around, most customers don't need a receipt. You could change the default setting, so the ticket was not printed out, unless the customer asks for it.
- Many printers in offices are capable of printing on both sides of the paper, but it requires a potentially time consuming expedition down the menus to set it up. Instead it could be set as a default that longer documents should be printed on both sides - unless you ask for the opposite. Similarly, the word processing programs by default could layout documents with less margin and a slightly smaller font size.
- Many fixtures in showers today have a little stop function, so you don't turn the bath water to more than 38-degree heat - unless you insist and override the button by pressing a bit harder. Many faucets have a similar lock, so you are not as likely to open up the tap fully.
- Some power companies on the utility bill show how large your consumption is compared with the rest of the residents in the neighborhood. By making consumption transparent, you can nudge those with high consumption to save a bit – rather than by drastically imposing restrictions on them.

The default concept feels a bit like the "law of gravity", I just mentioned: in many ways society is organized so that it almost automatically triggers material consumption.

We have already touched on how the prices that govern markets can be misleading because they typically do not include environmental costs. This is an example of a factor that systematically encourages businesses and consumers to spend more resources - because people are more inclined to consume what's cheap.

The default mechanism can also be used to encourage people to behave more environmentally friendly. For example, transport offers a number of possibilities for changing the system "laws of gravity":

- In Denmark, there is a political desire to facilitate labor mobility, and therefore we have a relatively generous transportation tax deduction for people with long commutes – which many people consequently have.
- The taxes on car use are put on the acquisition of the car, making people reluctant to buy new and more efficient cars. If instead you paid per kilometer or depending on CO2 emissions, the system would encourage people to drive more efficient cars, and they would pay more attention on a daily basis to use the car sparingly, because they would be confronted with a much higher ongoing operational cost.

- The architecture of the infrastructure promotes a certain lifestyle. When one chooses to invest in highways rather than rail or bike trails, you are building an infrastructure which makes it easy to drive private cars - and correspondingly more difficult for those who would like to participate normally in modern life, but with a less energy intensive way of getting around.

In the same way, one could examine housing, retail, agriculture, waste, etc. to find mechanisms that lock us into an anachronistic lifestyle. Currently, society's infrastructure generally does not support sustainable behavior. The interesting thing about examining the implicit and explicit defaults that we operate by, is that it makes it more visible how society, the law and our technology all have a built-in bias or "gravity" - but we are so accustomed to the way things work that we don't notice it.

The revolution should be a bargain

The balance between the individual and the community is the recurring theme in this book, and the basic claim is that the balance is shifting. We have the main challenges, we're facing, in common, and as individuals it is extremely limited what we can do about them. The distance between our own and the common interest is getting shorter, and increasingly, our own well-being cannot be separated from how others are doing. In principle, this should motivate us to take factors beyond our own immediate interest into account when we act.

But we are a bunch of spoiled consumers. We want it easy, fun, a little smart and trendy - and cheap, not least. We are accustomed to getting what we want, and that doesn't include any kind of austerity. And now we are supposed to save the world... Tough odds, but that is the reality we face: If the majority of people are supposed to voluntarily engage in concrete action towards the environmental and climate problems, it must appear as a positive option. It should feel as a choice, which leads to growth and prosperity. It's no use being naive or romantic about it; human nature will not suddenly change. We are loving, helpful, proactive, flexible and many other good things. But we will also continue to be opportunistic, we will think of ourselves foremost, we will try to get as comfortable as possible, and we will try to show off and impress each other.

It would be nonsensical to try to change it. If we are going to get anywhere, these are the conditions we have to play under.

The business of saving the world

Businesses know how to play that game. Businesses are created to develop new, exciting solutions and present them in a way so people gladly will pay to get access to them. Companies can innovate, optimize and act rapidly and at large scale. Businesses know that what they offer must be attractive.

Historically, we have managed our way through times of scarcity by inventing new, smarter ways to use resources - and that, too, is a natural strength of business. The success of a company depends on their ability to offer their services more cheaply than their competitors, and therefore, companies have an intense focus on efficiency.

If we can harness the market forces to pull the transition to sustainability forward, there are far greater chances of success.

This brings us back to the idea of *gravity* or default settings.

It is an important point that it is not a given which way the market forces pull.

Business must be profitable, so you use what is cheap, and conserve what is expensive - but what's expensive or cheap is very much a political issue. For example, taxes, subsidies and regulations could tilt the slope of the fitness landscape, so to speak, so the opportunities are greatest and resistance is least for those who cause the least environmental impact.

Currently, the tax system roughly doubles the cost of labor, and consequently, we show great ingenuity in trying to save on human labor. If instead the tax revenues were collected from taxing resources and CO2 emissions, there would be an equally intense focus on streamlining and rationalizing the use of expensive raw materials.

Currently CO2 emissions cost next to nothing, so it is obvious that there is very little incentive to build businesses based on trying to reduce waste of energy. What little amount of duties and quotas, we have introduced so far are not nearly enough to push the changes we seem to need. We began this chapter with McKinsey's finding that we will need to create ten times more economic value for each kg of CO2 we emit. That figure is for *global* emissions, so it's probably realistic that the western world with its advanced industrial base and infrastructure will have to lead the way with even greater reductions. This will not happen unless the prices of fossil fuels are substantially higher - the price increase that's needed is not just an adjustment of a few percent.

It's controversial, unpopular, painful and inconvenient to change our lifestyle, and it is hard to see how the politicians will be able to implement the necessary measures. On the other hand, it is difficult to see how we can avoid it.

Ultimately, the shift will happen by itself. As resources become scarce, the market will push up prices. The problem is that it may turn out to be an extremely harsh and uncontrollable solution when the system suddenly goes into wild oscillations.

The longer we maintain a system that favors and maintains the old logic, the more violent the transition is likely to be, when the model eventually breaks down.

Politicians cannot and should not tell businesses exactly what they shall produce or how they should do it. But they can and should control the overall direction of development by adjusting the rules and conditions that govern how companies prioritize.

A restructuring of the tax burden and greater accounting for externalities would probably be the strongest signal you could send to indicate that we've come to a new era in which we need to manage by other means.

Convergence between environmental and human interests

In his book *The Politics of Climate Change*, the eminent sociologist Anthony Giddens writes about creating "political and economic convergence" - organizing in ways that create a more direct correlation between the goals we pursue, in economics, politics and environment matters.

As an example of political and climate policy convergence, Giddens mentions the close relationship between the wish to avert climate change and the need to increase the security of energy supplies. A policy that calls for a massive expansion of renewable energy is also a policy, which leads the country to become less dependent on importing oil and gas, at the mercy of more or less friendly regimes.

Similarly, one could strengthen economic and environmental convergence - by ensuring that there is an overlap between what is profitable for companies to develop and sell, and what it is good for the environment.

The pre-requisite for this to happen is that politicians create a new economic framework. Currently, the economic logic makes considerations for the environment and climate look as if they were in opposition to growth, prosperity and wellbeing. Paradoxically, in many cases it is the politicians from liberal and supposedly business-friendly governments that oppose measures to protect the environment, while large industrial companies lobby governments to tighten the environmental requirements and put more taxes on CO2 emissions.

Cleantech has become a buzzword in business. While the world's governments find it difficult to agree on policy actions that can support sustainable development, plenty of industrial giants have seen the writing on the wall and have begun to make large scale investments in order to develop products and solutions that fit better with a low carbon economy. These businesses see a golden opportunity to get a competitive advantage by providing solutions that are more frugal and emit fewer greenhouse gases.

Cool, green jobs

How will we make our living in the future? What can we, in our part of the world, offer countries in the emerging markets that will soon be able produce anything cheaper themselves than we can?

We, in the developed economies, must develop the solutions that will make it possible for mankind to come unscathed through the funnel - preferably even with our quality of life intact. There are plenty of needs and challenges to address - basically; the entire global infrastructure needs to be rebuilt. Food, energy, transport, health and hygiene must be delivered in ways that only require a fraction of the natural resources, we use for them today.

This is not just an engineering task. It is just as much about designing services that support a completely different lifestyle under changed circumstances.

The world needs examples of how you can live confident, happy, healthy, creative and surrounded by quality – while contributing to correct the problems that otherwise are likely to erode the foundation for a secure and flourishing society. That's the kind of solutions, which the market will demand.

We must use bits to minimize the use of atoms

We have discussed how the political and economic law of gravity tends to stand in the way for the development of the types of solutions and products that should be the core of the businesses of the future.

If instead we should be a bit optimistic, we can rejoice that large parts of the globe has just been through an extensive installation of a vital tool for the transition to a new economy. Since the dot.com boom at the turn of the millennium, huge sums have been invested in laying cables and building rapid and extensive digital networks. We still have only seen the beginning of what it can be used for, and over the coming decades, information technology will really start to change our conditions as the digital technology evolves and extends its reach.

In a historical perspective, we've had periods of prosperity, which improved conditions and opportunities for the entire population. These periods of growth have

largely happened when resources that were previously scarce, were "released" and made cheap by new technology.

The Venezuelan economist Carlotta Perez has analyzed the major periods of prosperity of the last few hundred years. The middle of the 1800s saw a boom in the construction of railroads, which linked the cities much closer together, economically and culturally. Later, in the late 1800's, there was a massive building of ports and shipping on all continents, which made a new level of global trade possible. In the early 1900-century the oil era began, leading to the modern convenient and mobile lifestyle.

Each of these periods of prosperity was preceded by a period of economic turmoil in which investments in the new technological infrastructure greatly exceeded what was actually needed. But after the inevitable financial collapses and consolidation, a long period of stable and inclusive growth followed, as businesses and consumers discovered how the new technology, which was now cheap and widely available, could be exploited in all sorts of hitherto inconceivable contexts.

Carlotta Perez concludes that after the last few decades of hectic expansion of the global networks, and after going through the "teething problems" in the form of speculative bubbles and runaway financial systems, we are now about ready to reap the real benefits of being intensely globally and digitally connected.

In previous eras it was oil, steel and the overcoming of distances, which was put at our disposal. However, the basis for the next period of prosperity is different; this time the resource we are getting access to is not physical. This time the revolution is in our access to knowledge; *bits*. The price of creating and sharing knowledge is lowered dramatically, and, interestingly, this happens just as the cost of using atoms is beginning to move upwards.

Businesses naturally tend to spend freely what is cheap, and conserve what is expensive. Therefore, the economy of the future will be based on using bits to conserve atoms.

All told, a good candidate for a game rule for the economy of the coming decades is that you must use knowledge, communication, computing power and sensors in extreme amounts to squeeze the utmost from the scarce natural resources. Unless you understand how to exploit natural resources much better - both as an individual and as part of your professional skills – you will feel badly fit for the future.