Patiently impatient - Belief in the potential of the sun

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It is not a matter of physical resources. Nor is it a matter of technology. At a reasonable cost, 10 billion people could live on our level. The problem lies in the readjustment to a new, sustainable energy system. Can we bring this about sufficiently quickly?

Each year, the Earth is reached by 10,000 times more solar energy than the total global consumption of coal, oil and natural gas. At the same time, solar cells – which have been developed since the 1950s – are now so efficient and cheap that they could more than satisfy the world's entire energy requirements. There is no doubt that the sun represents the future," states Björn Sandén, Professor of Environmental System Analysis.

"Certain forms of nuclear energy still have major physical potential, as does power deriving from coal. But the greatest resource, and the one that entails fewest problems socially, environmentally and in terms of safety, is solar energy."

What about wave power, wind power and biomass? "Of course these should also be used but whatever way we look at it, they only make up a fraction of the energy we receive through continuous solar radiation. That's why we should be talking about the sun," states Björn Sandén.

Dramatic position

The potential is enormous. Colossal in fact. This is particularly so if you contemplate the joint development of solar energy, nanotechnology and materials technology. It could revolutionise the order of things, not only for our energy system but also for the way we construct buildings and manufacture clothes.

Development is rapid. During the past 10 years, the solar cell industry has grown worldwide by 40-50 per cent per year, which sounds good. The question is whether it is sufficiently good.

"Living in a small, tranquil country where nothing much happens, we might feel that in the short term society is stable. But the picture changes if we extend the time horizon. Viewed in the long term, we find ourselves in quite a dramatic situation."

There are now seven billion people living on Earth and we are using 50 times more energy than we did 200 years ago. There is a thrilling, head-to-head race going on between our growing demands and the development and application of new knowledge.

Where will it end? Björn Sandén doesn't have the answer.

"The world is made up of complex, global systems and in truth no one has real control over the dynamics in the systems."

Ketchup effect

"Changes can take place more quickly than we might believe. We only need to look at the global economy. A crisis in one country quickly leads to unemployment in another without anyone having the time to work out why. Civilisations have collapsed in the past and it is quite possible that present-day society is also on the verge of collapse. Surprisingly, such complex dynamics can also have a positive side," states Björn Sandén.

"We might feel that something major and turbulent is currently taking place in society but in reality it began 50 years ago. That's the case with sun, wind and bioenergy. Slowly but surely, new energy systems have developed quietly in the background before the top finally flies off the ketchup bottle. And once the ketchup starts to flow, everyone says: "Goodness, how quickly things are moving!"

There is thus reason to be hopeful. Björn Sandén cites an encouraging illustration. In the 1990s, the head of a non-profit solar energy association in Aachen in Germany came up with the idea of having a cost-price system for solar energy in the city. Anyone who fitted solar panels on their roof would have their electricity subsidised by two Deutschmarks per kilowatt-hour.

"At first a lot of people thought they were out of their minds. But the power company was able to spread the cost among all the consumers and soon the concept spread to a further 40 cities. In 2000, it was announced that the idea would be implemented throughout the whole of Germany. Now it has spread to 40 other countries, including China."

But not in Sweden. In Sweden, a technology-neutral policy is applied. At first glance, this might seem admirable, but politics should not determine which forms of technology we use. The problem is that if politicians waive responsibility and the opportunity to make decisions, market forces will decide. As the market often thinks in the short term, Björn Sandén maintains that there is a very tangible risk that we will become ensnared into new one-way streets with technology that fails to address problems in the long term.

"No policy is technology neutral. Ultimately, technology-specific support is always granted and the only question is who will receive it. In the end, it is the one that shouts loudest or the one who happens to be most popular at the time. Established technologies are always favoured at the

expense of those that are in the process of developing."

The courage to make mistakes

"Fundamentally, a technology-neutral policy is an incorrect way of thinking," says Björn Sandén. "Technology has always been political. The steam engine, the combustion engine, electrical systems, computers – they have all been created by and for the society in which we live. It is therefore vital that politicians have the courage to think technology in a visionary, strategic way. It is not sufficient, as is the case today, to simply sit, administer and make as few mistakes as possible, when we find ourselves on the brink of a ravine.

"If we are to invest in readjustment to a sustainable system within 50-100 years, we must help to bring to the fore a number of different technologies in parallel as it takes several decades to move from concept to a large-scale market. And if the technologies out on the periphery are to stand a chance we must invest in control mechanisms that are technology-specific," says Björn Sandén.

He continues: "There's no need to be afraid of making mistakes. Of course, you should be careful with public money but it doesn't cost a great deal to stimulate niche markets when new technology can be given the opportunity to grow. Not if you're in there from the beginning."

Björn Sandén does not want it to sound as if the fault lies with the politicians. It must be borne in mind that politics has rules.

"All those involved in a system have limited freedom of action. Even Barak Obama, who in a sense is the world's most powerful man.

We may have limited power but we still have collective responsibility.

"It could be relevant to turn things around and ask ourselves how we can induce engineers to become more interested in politics. I don't have the answer. My humble contribution is to teach about socio-technological systems – the link between technology, politics and economics – and to participate to some extent in social debate. The rate of change might appear sluggish. This is the nature of complex systems. That's why it's important to be patiently impatient," states Björn Sandén.

"On the other hand, renewal always starts somewhere. The solar industry, for example, emerged thanks to what was accomplished in Germany. Everything started with a solar cell enthusiastic in Aachen. The same thing could happen in Sweden," states Björn Sandén.

"Perhaps that's what's happening at the moment. Are things taking place behind our backs and are we failing to appreciate their full significance. Who knows?

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