

The BY LARS G. JOSEFSSON *Economics of* Climate Change

And the vacuum in global leadership.

The changing climate due to human behavior is the overwhelming challenge of our time. The scientific knowledge is clearer than ever: if we do not take efficient and lasting actions to curb today's largely uncontrolled greenhouse gas emissions into a future situation where low or close to zero emissions are the norm, mankind will be headed for a future of catastrophic change. Human life as we know it will be impossible in many places around the world. The most immediate effects will be a water shortage and harsher weather conditions, but on many fronts climate change will be a threat to sustainable welfare, global stability, and growth. At present, though, the trends are still going in the wrong direction. Previous worst-case scenarios are being revised to describe even more pessimistic alternatives. Things are getting worse. How can this be?

The breakdown of societies due to human destruction of the environment is not unparalleled in history, and has been described and analysed by Jared Diamond in his book *Collapse*. Easter Island, the Mayan Society on the Yucatan peninsula, the Viking settlement on Greenland—many individuals living in those societies must have noticed the negative trends. Many of them also recognized the cause, but as collectives they were unable to change direction and achieve sustainable development. Cultural issues, local power struggles, inability to learn new skills, attitudes towards the question of responsibility—all probably played important roles. The political capacity needed to avoid an obvious disastrous long-term development was lacking, and actors in those societies did not support each other to the extent needed to facilitate effective action.

The deal forming the United Nations Framework Convention on Climate Change was struck in Rio 1992 and it went into force on March 21, 1994. As of today almost all nations in the world, 192 countries, have ratified this treaty. All agreed on the need to stabilize the concentration of greenhouse gases in the atmosphere with the goal of preventing 'danger-

Lars G. Josefsson is President and CEO of Vattenfall AB.

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888 16th Street, N.W.

Suite 740

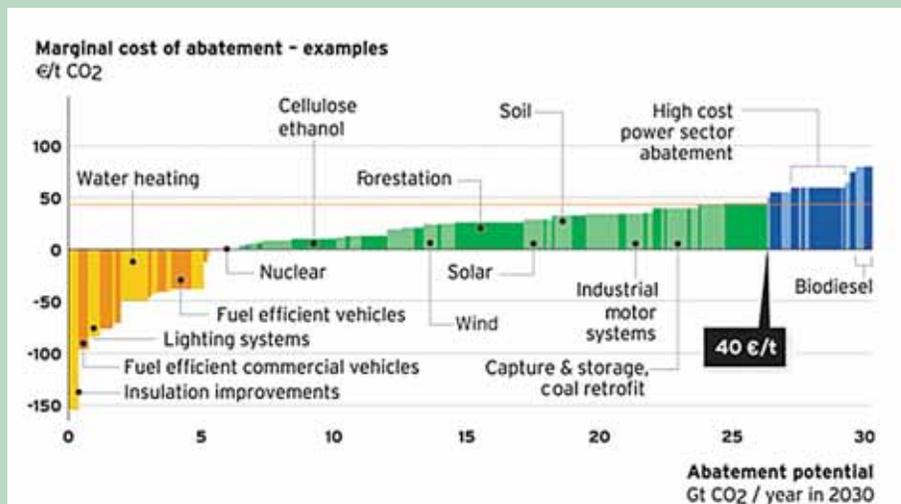
Washington, D.C. 20006

Phone: 202-861-0791

Fax: 202-861-0790

www.international-economy.com

Global Cost Curve



The initial data collection for the cost curve was conducted by Vattenfall together with McKinsey and Company. Conclusions based on the work are the responsibility of Vattenfall.

between stabilization of greenhouse gases in the atmosphere and the associated climate change and impacts. Based on the best available understanding of what is necessary, it is natural to ask whether it is possible to do what is required, and to estimate the cost to get it done. One answer to these questions can be found in the Global Abatement Map study presented by Vattenfall Group in cooperation with McKinsey & Co. Based on the work of the IPCC, this study assumes that a stabilization of greenhouse gases to 450 ppm carbon dioxide equivalents is likely to limit the temperature increase to two degrees Celsius. This implies that we need to concern ourselves with eliminating some 27 of the estimated 58 billion tons of emissions projected for 2030.

ous interference' in the climate system. The Kyoto Protocol was agreed in 1997, establishing for some countries the first binding national commitments to reduce greenhouse gas emissions. Though flawed, these were landmark agreements. But more than a decade later, they have not delivered: still emissions are growing, and the talk and the walk are going in diverging directions.

The local tribe on the Easter Island probably argued that, if we do not chop the tree down, a neighbor would. Arguments in the debate today sound very similar: "We want to preserve our way of life." "You caused the problem—you should fix it." "We cannot afford to take measures." "If they do not move, we will not move." Somebody else seems to be responsible. We have to move from a "shame and blame" game to action built on shared responsibility for our common future. There have been a few successful examples of global collective action in the past—including the Montreal Protocol on the ozone layer—but never have so many actors needed to change such a fundamental aspect of human activity. The political interests appear to be divergent. The infrastructure appears to be entrenched. The will to change is compromised at every turn by the easy options of short-term self-interest and business as usual.

How, then, can we make the needed change politically possible? First, the problem has to be addressed in factual terms. What, in fact, needs to be done? The Nobel Prize-winning efforts of the Intergovernmental Panel on Climate Change have begun to answer this question, illustrating the connection

this is fully possible. Over two-thirds of the measures can be achieved with available, identified solutions. A significant proportion—25 percent—appears possible to introduce at costs that are insignificant or negative, provided that suitable control measures are applied. No single technique or solution can solve the whole problem, but the sum of all options makes the necessary changes viable. The measures are largely linked with new construction or major investments, which shows that there is no conflict between continued economic growth and increased climate efficiency—quite the opposite is true at present conditions.

Beyond 2030, new technology can have significantly greater effects. An estimate of a possible trend from 2030 to 2070 indicates that the power sector over the long term could be entirely free from emissions and that the quantity of emissions

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from other sectors could be substantially limited, despite continued vigorous economic development and population growth on a global scale.

Potential measures are spread throughout the global economy: no individual sector or region can provide more than a contribution to the total reduction needed, but, if we are able to influence the global economy in the right direction, the abatement needed can be delivered. The task is doable. The cost to get it done is likely to be a small fraction of global GDP, perhaps half a percent. But it will not happen by itself, and unwise and uncoordinated policies can multiply the costs many times. The total cost of this transformation depends primarily on how it is introduced. Sudden changes can lead to shock effects in the economy. Uncoordinated changes can lead to distortions and misallocation of resources. And delays in action may make emergency measures necessary at a later stage, which will almost certainly cost more. But a sustainable, long-term, and market-led approach can reduce the total costs to a very low level.

If we know what we have to do, what is possible and affordable, why is so little happening? Questions remain as to who will deliver, and what are the conditions necessary to stimulate the measures needed. Clearly, the vast majority of all measures have to be achieved through normal market forces. The only alternative is public financing which will be harder to marshal, and is likely to be more costly and less effective.

But the market has the capacity to deliver. Given stable, credible market conditions, clear and trustworthy political commitment, and a possibility to compete for profits and create value, business will supply abatement measures and rebuild the world economy. This will be the greatest investment opportunity since the rebuilding efforts after World War II. The key element is that there has to be a market price, as global as possible, on emissions. The price formation has to be predictable, transparent, and credible.

If it is reasonable to assume that emission reductions will create future value from a business perspective, then managers and investors will compete to capture every reduction opportunity available, innovating and creating new approaches on the way.

Of course, many measures reside with actors who do not always have a clear investor's mentality: limiting emissions from households and automobiles, for example, will probably require measures like efficiency standards and building norms. Likewise, land use and forestry practices will have to be influenced by a combination of market incentives and rules and norms.

And while a price on carbon will incentivize the development of new technologies, support mechanisms can help bring these technologies to market more quickly. Public funding of research, public-private partnerships in demonstration, and public support for deployment of new technologies will all help make a low-emitting economy possible.

We have the future in our own hands. A wise handling of the climate change challenge demands a mutual ambition to reach a mutual goal. A global agreement to combat climate change must be reached, and in order to do so, an enlightened, long-term view must be made politically possible for every major economy.

The climate challenge is basically political. The core issues are about the fundamental prerequisites for future wealth and global security. It is on this foundation that the give-and-take to build up global understanding must be based. The foundation must consist of a common acceptance of responsibility and mutual commitment. The mapping that has been made of potential measures shows clearly that it is not possible to address the climate threat through measures in certain regions or sectors. The entire global economy must be transformed.

The political capacity is dependent on leadership: not only political leadership, but joint leadership from many

sectors in the global society. True leadership is based on fairness. Fair solutions are needed to gain the wide public support needed to go from agreements in principle to real actions such as investments in low-emitting solutions. But a mutual sense of fairness requires a common understanding of basic facts. Today, a shared view on basic facts and figures is largely lacking. The Climate Map approach referred to earlier can be used as a base for a dialogue to build common understanding.

One strategy would be to use a Global Abatement Map, ideally backed the International Energy Agency, IPCC, and the World Bank, as a baseline from which a subset of national abatement maps could be produced. If every country were asked to come up with a proposal for its contribution, we would have a unilateral interpretation of fairness for the country in question and the possibility to relate the proposals made to shared knowledge. This would lower the political thresholds for making commitments substantially.

Leadership is also about taking action at the right time. Nations must agree on binding emission restrictions. If this is to be possible, restrictions will have to be designed so that they do not constitute obstacles to development and do not create an economic shock for any single nation. At the same time, the effects on the power of international competition must be reasonable and acceptable for all parties concerned. According to the calculations we have made at Vattenfall Group, this is fully possible but will of course make major demands on the ability of the international economic and financial community to cooperate.

The nations of the world should be asked how they can contribute, which efforts can be made based on a correct description of the available abatement potentials and cost estimates. Just asking these nations for their contribution is, of course, not the final answer, but it can be the first step towards a virtuous circle, a way of breaking the present deadlock that over the long run will produce dire consequences. If a positive circle starts spinning, it will soon be obvious that the laggards will be the losers since their economies will be less competitive in the end.

A global framework must be established to facilitate this. The focus must shift from shame and blame and endless negotiations to lowering the thresholds for making promises and taking on responsibility for a common future. A strong global framework will have to be built step by step and it must act as a funnel allowing each nation to start where it stands and adjust commitments over time without sacrificing the long-term goal.

A global framework must first of all provide elements making it possible for nations to cooperate to build a common future. Fewer than twenty economies stand for over 50 percent of the emissions. Their participation is decisive. If the large economies show leadership, the rest of the world

will follow; if not, it will be very difficult to limit man-made climate change.

Unless the world's leaders inside and outside of government manage to handle the challenge in time by steering the markets in the right direction, the cost of the damage ultimately caused will increase and significantly more draconian measures will in time become necessary. Over the long term, there is a threat that the ultimate instrument of politics, armed conflict, will have to be used.

But given leadership, the sea change needed can be achieved. I truly believe that we are capable of creating the momentum that will change the current negative trend. Global business has a key role to play since political reservations often are based on a fear that local business will be disadvantaged through a global agreement. Business leaders must speak up and support the politicians. Industry can and should be an ally, not an obstacle.

Industry, too, must make a commitment. There is much we can do in our own businesses. Power and industry must reduce our own emissions and be a positive influence on the carbon footprints of our collaborators, competitors, and customers, while finance and insurance must develop new products and standards that facilitate the funding and implementation of tomorrow's technologies. But the most important thing we as global companies can do is to actively push for the establishment of the necessary global framework.

The key role that business can and must play is the reason why I have founded the 3C (Combat Climate Change) Initiative. As of today, it consists of more than fifty global business leaders who demand integration of climate issues in markets and trade. As business and markets already to a large extent are global, the business community has every reason to secure well-functioning markets and a level playing field. Through the success of the 3C Business Initiative it is obvious that many global enterprises agree that a market-based solution to the problem is in their own enlightened self-interest.

The roadmap agreed last year in Bali is sending positive signals, but to produce the drive needed in the process the major economies must show leadership and commitment. Otherwise, there is a substantial risk that the result will be too little, too late. We have to find a way to move from inaction and frustration toward concerted action mobilizing business, entrepreneurs, and scientists rebuilding our society into a more sustainable direction. The 3C companies are ready to actively support political leaders to make a global agreement politically reachable. We will do our utmost to facilitate the development of a global framework by cooperating with others. Leaders of the world, unite. We have to do our utmost to break today's deadlock and start getting things done. ♦