



The Future of Climate Change: Economic Growth through Energy Transformation

**Speech by
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Ladies and gentlemen.

A few days ago the United Nations Climate Change Conference was opened in Copenhagen, convened to discuss the gravest problems now threatening mankind and examine possible solutions, advanced technologies and frameworks of cooperation which could allow us to rally all countries, all people, hoping that we have the necessary wisdom and a sense of responsibility to succeed.

Settling the differences between the emerging economies and the industrialized countries is a formidable task, but the increased awareness of an immediate threat and the progress made by research and scientific discoveries offer more hope of succeeding than we had a few years ago.

For a long time it was an uphill battle even to discuss climate change, because the doubters and the nay-sayers occupied centre stage. Recently we have seen a fundamental shift, primarily because the evidence is now overwhelming. Research on the Arctic and the Greenland ice sheet indicates that the point in the melting process, which was expected to occur in the middle of the 21st century, has in fact already been reached. Global warming is now several decades ahead of schedule.

In recent years we have gained increasing awareness of how our eco-world is in fact a single system, how developments in one particular area of the grand mechanism of our existence may have hitherto undreamt-of consequences in another. The most dramatic contemporary manifestation of this interdependence is the relationship we have come to understand between climate change and the destruction of the soil, and how this constitutes a vicious circle.

As land loses its cover and vegetation retreats, its capacity to capture carbon is reduced, and this in turn accelerates climate change. Warmer years may result in droughts, affecting water resources and an endless number of eco-systems, often furthering the spread of dangerous diseases.

In Iceland we are witnessing the alarming rate at which our glaciers are melting. Some mountains and valleys that were covered by ice for centuries have now become exposed.

My country can indeed be described as a theatre of climate change because major natural systems are located either within Iceland or in the ocean around the country. We have the largest glaciers in Europe, and for over a century we have been struggling to contain the largest desert in Europe. The Gulf Stream encircles our island, mixing with the water produced by the melting of the Arctic, creating what can be described as

the motor driving the global conveyor belt of ocean currents and influencing the climate all over the world.

However, Iceland is not only a theatre of the processes and consequences of climate change. It can also serve as an inspiration, as an example of how to retard change through a comprehensive transformation of our energy systems, which also brings an enormous economic advantage.

Mankind now faces the crucial question: How much time do we really have to deal with this problem? Some of the distinguished scientists who are in the forefront in examining this issue have claimed that we only have 10 to 15 years to take the necessary measures to prevent fundamental climate change. Others, who are more conservative, maintain that we have perhaps 20 to 30 years. Whichever camp is right is almost immaterial, because in either case, it is an extraordinarily short time.

To me this is almost a nightmare scenario: such as short time to contemplate what we must do, especially when we also consider what is at stake.

Following on from the melting of the ice, rising sea levels will affect island states all over the world and also coastal areas, ranging from the United States to Latin America and to Asia and Africa.

Recently we have also woken up to what is happening in the Himalayas, an area that is sometimes referred to as 'the water-tower of Asia', containing water reservoirs for over a billion people and providing the basis for both food and energy production.

Although more research is needed, some experts predict that the Himalayan glaciers, of which there are thousands, are likely to disappear

completely within the next 30-40 years. This is an alarming prospect for China and India, which together account for more than one third of mankind.

We are now faced with a fundamental task: What can we do? How can we combine our efforts to deal with the greatest challenge of the 21st century? The solutions must involve not only the international community but also cities and regions within countries. It has been encouraging to see initiatives taken by many states and communities within the US. Furthermore, in the business community, many companies have begun to take action.

When, with my friend Jeff Sachs, I established the Global Round Table on Climate Change a few years ago, inviting almost 100 large corporations, primarily from the United States and Europe, to sit down around one table and discuss this challenge, I was pleasantly surprised to discover the pragmatic and forward-looking thinking in progress at some of the strongest corporations, including oil companies and energy companies.

To some extent, I would even go so far as to say that many of the most prominent corporate leaders in the world are ahead of both the international institutions and of many national governments in their call to action.

In the last three years, I have had a number of meetings with President Hu Jintao and other Chinese leaders and also with ministers and other prominent figures in India. I have observed a fundamental change in their view on climate change. China is clearly determined to reduce the pollution which now erodes the quality of life in its growing urban regions. The emerging middle class wants to preserve its health and enjoy the freshness of the air. The leaders have also discovered that air pollution

in the cities is a potential source of social unrest. This might partly be the reason why they have become more constructive, deciding this year to announce the target of reducing ‘carbon intensity’ by 40-45% by the year 2020 compared to the level of 2005.

In his speech at the UN Climate meeting in New York last September, President Hu Jintao stated:

“Global climate change has a profound impact on the survival and development of mankind. It is a major challenge facing all countries. . . . We should make our endeavour on climate change a win-win for both developed and developing countries.”

He added that China has taken steps to tackle this challenge by radically increasing forest coverage and volume, by enhancing the share of non-fossil fuels in energy production and by improving energy efficiency.

The deterioration of the Himalayan glaciers and their water systems is a strong reason for India and China to monitor current and future climate change more closely than ever before; to become active partners in the search for solutions.

Thus, China and India could suffer the most immediate and disastrous consequences suffered by any country. Their leaders might argue, correctly, that it is grossly unfair that the two billion or more people living in those countries should be so severely affected when climate change is primarily caused by the economies of Europe and America.

Since for China and India the stakes are indeed higher than for most Western countries, it is, in my opinion not inconceivable that they could, in the next 10-20 years, achieve greater CO₂ reductions than either the US

or Europe. The common excuse, which is so often quoted, for non-action in the West – that China and India are not doing enough – might thus be reversed. By 2025, the two Asian giants could be calling on the US to match their CO₂ reductions.

The world needs a far-ranging transformation which must concentrate on a very simple but fundamental aspect of the problem. Climate change is perhaps not the right term. In its essence, this is about the future of energy. Without fundamentally changing the structure, the pattern and the nature of our energy systems, on a national, regional, city, corporate and individual level, we will not succeed.

We should therefore start looking seriously at two fundamental sources of clean energy. One is above our head: the sun, which provides us with an enormous amount of clean energy. Fortunately, companies, scientists and engineers are increasingly coming up with methods to utilize this energy. The other is under our feet: the enormous fireball which, as we learned at school, lies deep inside the earth. The combination of the fireball inside the earth and the sun above our heads constitutes a fundamental clean energy resource that can help us to deal with the problem of climate change.

Iceland is significant in this respect. In the last 40 or 50 years, we have been able to transform our energy system from being, as it was when I was growing up, over 80% dependent on imported coal and oil, to the present position where 100% of our electricity production and 100% of our space heating needs are met from clean energy sources.

What began as the use of hot springs to wash clothes or heat houses, has been transformed to a geothermal energy resource for aluminum smelters, for data storage centers, for industries and IT companies. Since we stopped importing oil to heat our houses, a development which

followed the oil crisis in the 1970s, what we save every 10 years thanks to our use of cheap domestic geothermal energy instead of oil amounts to one year's Gross National Income. This is a clear demonstration of the huge economic benefits of energy independence.

One of the contributions that Iceland can make to the rest of the world is that we have shown, through technological and business innovation in the last thirty or forty years, how to harness the fire inside the earth in order to produce electricity and energy on a large scale, making good use of the fact that geothermal energy is about 30% more profitable than any other form of clean energy.

The abundance of clean energy is the main reason why Iceland is now, notwithstanding the financial crisis, an attractive investment location for foreign companies. An ever-growing number of investors are willing to go anywhere if they can get permanent and secure access to clean energy, thus becoming well positioned when a global carbon tax, in one form or another, is introduced. This magnet nature of clean energy production is especially important for 21st century IT investments, for software and information-based companies. For this reason, an abundance of clean energy will give countries a strategic advantage in the 21st century global economy.

The people of Iceland have also been able to meet the setbacks caused by the collapse of our major banks and the global financial crisis partly because our energy economy was transformed some years ago to provide cheap clean electricity and space heating, making the economic hardships for families and homes less severe than in many other countries.

Green energy is thus not only making my country an attractive location for hi-tech and industrial investments, and thereby helping us to

recover from the economic crisis sooner than would otherwise be the case; in the future it will also provide a strong defence against social hardship created by financial crises which are likely to continue to occur.

There are more than 100 countries in the world that could effectively use geothermal resources in this way, and for the United States of America, geothermal energy can become a major part of a new, profitable and business-friendly energy system, contributing to the security of the country, limiting dependence on the import of fossil fuels, reducing the risks caused by fluctuating oil prices and providing opportunities for new infrastructures, supporting the cities and regions where the resources are located.

As the U.S. Secretary of Energy, Steven Chu, has said, the amount of geothermal energy potentially available, is ‘effectively unlimited’. And Al Gore in his book *Our Choice* (pp. 94-95) illustrates this clearly:

‘According to the U.N. World Energy Assessment report, the geothermal resource is roughly 280,000 times the annual consumption of primary energy in the world. In the United States alone, according to two other experts, Bruce Green and Gerald Nix, “the energy content of domestic geothermal resources to a depth of three kilometers [1.86 miles] is estimated to be three million quads — equivalent to a 30,000-year supply of energy at our current rate for the United States.” The Massachusetts Institute of Technology, in a major assessment of geothermal power in 2006, estimated that the “technically extractable portion” of the U.S. geothermal resource is “about 2,000 times the annual consumption of primary energy in the United States.” As a consequence, assuming appropriate improvements in technology over time, geothermal could provide a significant fraction of U.S. primary energy needs in a

sustainable manner for electricity generation and for the heating and cooling of buildings.’

Geothermal energy is indeed a reliable, flexible and green energy resource.

It is *reliable* because it provides base-load power 24 hours a day and is available throughout peak hours.

It is *flexible* and can be tailored to needs accordingly. This is a clear shift from the public debate, which has been preoccupied by ‘big solutions’ in the field of energy, centred on coal, oil and nuclear programmes. In many places, geothermal energy can provide a ‘big’ solution, but in many others it can serve a single city, large industries, a small town or as little as a single household. This flexibility can bring significant advantages.

Geothermal is *green* because the CO₂ emissions involved are 35 times smaller than when coal is used to produce an equivalent amount of energy,

Geothermal plants require by far the least land for electricity production per energy unit compared with all other available renewable sources.

And it is *cost effective*. The cost of electricity produced with geothermal energy in the US is expected to be between five and eight cents per kWh. This would represent significant savings for individuals, communities, and companies.

If we add all of this together and bring solar energy, wind energy and other types of clean energy into the picture, we have the possibility of a comprehensive, complete, cost-effective and profitable transformation

of our energy systems, making our nations more secure and more prosperous, reducing the economic effects of fluctuating oil prices.

It is encouraging that many of the most important corporations in the world, e.g. in the field of aluminum and steel production, software and information technology, are already providing leadership in this area. We are now seeing what I would call the beginning of a race in the corporate world for access to clean energy resources. Countries, regions and cities which can provide such clean energy on a long-term basis will have a strong competitive position in the global market in the 21st century.

Since the Internet requires an enormous amount of energy, as do the large data banks that are now being created at an ever-increasing rate, my country now enjoys a competitive position not just regarding access to clean energy resources for industrial companies, like aluminum smelters, but also for software, internet and data storage companies.

I have attempted here today to give you an overview of the argument that not only do we have to face up to the fact that climate change is happening, and happening faster than we thought a few years ago, but we also have to face up to the fundamental conclusion that the solution is all about the future of energy. Without transforming our energy systems we will not succeed.

While I am aware of the enormity of the challenge and the odds, I am an optimist; I seek inspiration from the fact that if we analyse the history of the 20th century, we see mankind being victorious in the face of great adversity.

We all know the enormous sacrifices made in the First and the Second World Wars, but we must also note how international cooperation was brought into being through those tragedies.

We have seen man going towards the stars and landing on the moon. We have seen the Berlin Wall crumble, and the transformation of Eastern and Central Europe.

Those of us who welcomed Presidents Reagan and Gorbachev in Iceland in 1986, at the height of the Cold War, at a time when the atmosphere was so glacial that it was earth-shattering news that they were even talking to each other, rejoice in how that meeting led to an enormous change in global politics, to the end of the Cold War, to a new Europe.

If that could be achieved within 10 to 20 years of the Reagan-Gorbachev summit, I believe we can also succeed in our present challenge. We now have ahead of us about the same length of time to find ways of averting disaster as has passed since Reagan and Gorbachev met in Reykjavik. . Every day when I pass Höfdi House, the small building where their dialogue took place, I feel an inspiration of hope and optimism.