



## The origin lies in manufacturing

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The global economic turmoil, which was triggered by the recent financial crisis, is said to be a 'once-in-a-century' event. Looking back to the past century, the Japanese economy faced several crises and overcame each of them. Even if the scope of the period is narrowed to the post-Pacific War era, our economy survived the pollution problems, the oil shocks, and the collapse of the IT bubble just to name a few. Moreover, from the viewpoint of each industry or each company, many other difficulties also seem to have been overcome in the past. It is not an exaggeration to say that the key driving force for such resilience lies in technology development on the basis of chemistry. Today, with global warming having become a hot issue as "another crisis," it is required to control the use of fossil fuels as one of the anti-global warming measures. (Whether an increase in the atmospheric carbon dioxide concentration is really a major cause of the rise in temperature on a global scale or not is another argument for another occasion.) Many years have passed since the issues surrounding the depletion of oil and departure from fossil fuels first started to be voiced, irrespective of anti-warming measures. There are various views and data on proved reserves of energy resources. According to the data in my memory, the reserves of coal, oil and natural gas are estimated to last about 130 years, about 40 years and about 60 years, respectively, but these figures might rise a little more, depending on technological progress.

There is a move to embrace emissions trading, new energy taxation and the like as trump cards to reduce the use of fossil fuels and thereby combat global warming. Some people proudly advocate these measures as solutions with immediate effects, but it seems to me that their thoughts are far from being in line with the wisdom of people who have toiled at their work. Funds of one trillion yen or more have already flown out of our country to purchase emissions credits. Given this fact, how much more will be necessary to accomplish a 25% reduction in greenhouse gas emissions compared to the 1990 level? In addition, we need to understand that if costs of raw materials and fuels increase only in domestic industries, this would cause confusion in our nation's industrial world and might become a key factor in dampening its global competitiveness. Meanwhile, some countries in the pro-

cess of strengthening their global-warming-related regulations in particular have been studying measures not to create price gaps between domestic goods and imported goods from less regulated countries. But it seems that the Japanese government has yet to declare its position clearly. The government should have an obligation at least to ensure a fair and equitable playing field in global competition, but in reality the Japanese authorities have been discussing only separate taxes such as taxation on naphtha and other fossil fuels or the coal tax, all of which would virtually impose penalties on the industrial world, and that is regrettable.

Japan's origin lies in manufacturing. Our national wealth has been created by enhancing added value, or, to put it more concretely, by processing imported raw materials, producing goods and exporting them. As a country that is dependent on other nations for its resources, foods and national defense, Japan is commonly downplayed. Human resources, their wisdom and actions are all our nation can rely on. As a man engaged in the field of chemistry, I endeavor to discover ways for chemistry to contribute to anti-global warming efforts.

For example, let's consider the use of hydrogen, which leads the pack of non-fossil resources. Its storage, containers, packaging and its applications to internal-combustion engines, fuel cells, and carbon alternatives (reduction) are not novel ideas in principle. And yet, there are high hurdles and a multitude of challenging issues, partly because profitability of the relevant investment is severely poor with the current level of technology and partly because domestic laws might need to be revised. There are no easy development targets, not only for the field of chemistry but also for every industry and industrial sector. Nor does there lie any solution in an extension of conventional thinking. Therefore, new power and new ways of thinking through excellent human resources are expected both in chemistry and industrial sectors.

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