

# Long-Term Strategy for Energy Saving in the Building Sector

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## ABSTRACT

At the G8 Hokkaido Toyako summit in July 2008, countermeasures for the global warming issue were the major topic. At the summit, the necessity to decrease worldwide CO<sub>2</sub> emissions by 50 % by 2050 was agreed upon. Accordingly, the necessary reduction of CO<sub>2</sub> emissions among developed countries is calculated to be from 60-80 %. The author and his collaborators have attempted a long-term prediction of the potential for energy saving. At present, three Japanese Ministries (METI, MLIT and MOEN) are carrying out policies and promotions, supporting technological innovations and encouraging changes in business/household lifestyles. According to our calculations, if these efforts are successful, CO<sub>2</sub> reductions of about 36% and 38% (totally 74%) will be realized in the building sector and in the power production sector, respectively. This is expected to be achieved by the promotion of nuclear energy and renewable energy. This predicted amount roughly corresponds to the abovementioned reduction target for developed countries, according to the agreement at the G8 Hokkaido Toyako summit. However, such reductions in the building sector and the power production sector will only be possible if all of the various nationwide actions are accomplished, while there is no confirmation of the likelihood for the effectiveness, and thus the success, of the actions. By referring to experience, the validity of the prediction may be checked as follows. The Kyoto Protocol was negotiated in 1997, since which time the government of Japan has taken the leadership and has been engaged in the promotion of energy conservation in collaboration with nationwide industries, governments and universities. What is the result of these nationwide actions? In the ten-year period after the signing of the Kyoto Protocol, energy

consumption in the industrial and transportation sectors decreased a little. On the other hand, in the commercial and household sectors, energy consumption was about 20% higher in 2006 than in 1997. This fact indicates more difficulties in conserving energy in the building sector than in other sectors. At the same time, it is obviously a difficult task to reduce CO<sub>2</sub> emissions in the next forty years (before 2050) by 36% in the building sector and by 74% as a total with the power production sector. Considering the experience in the past 10 years, these figures are not realistic. The predicted amounts are overly optimistic; in fact, it is actually inappropriate to regard them as scientific predictions. We could only succeed in achieving these reductions with a great deal of luck. In order to accomplish the reduction targets, the innovations in policies, technologies and lifestyles toward energy conservation are indispensable. Without drastic reformation and improvement in various fields, which are worthy of the name, "innovation", the CO<sub>2</sub> reduction target of 60-80% is not possible. There is an additional problem: drastic innovation in the sphere of energy conservation cannot happen without a huge impact on indoor environment. It is well known that conventional HVAC and mechanical ventilation, which tend to consume a lot of energy, became very widespread in the twentieth century. It is not limited to these examples that drastic change of needs for energy conservation, which is far beyond present common sense, might be a new restriction to the current methods of controlling indoor environment. Researchers participating in the AIVC Conference and its activities are expected to deal with the problem of maintaining a comfortable indoor environment without conflicting with the need for energy conservation. It is a new, important research theme in the twenty-first century.