Urban resource and energy management for sustainable society

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A hard challenge to the sustainability in Asia is population increase though its growth rate is uneven among countries. Urban population percentage continues to increase in almost all countries. Industrialization in global scale as well as in country scales has made such population increase possible. However, such industrialized world causes unsustainable burden to the environment and resources. These burdens are large and linking to activities in urban area. Key issue in urban sustainability in developing countries is management of society, infrastructure and quality of life against the rapid population and economic growth, whereas that in developed countries is reduction of environmental loading with maintaining quality of life of dwellers. Resource consumption and greenhouse gas emission tend to increase with the economic growth of country. Their decrease under economically growing condition is big challenges unlike traditional air and water pollution which had been overcome in the developed countries.

Understanding the characteristics of each resource and its strategic use is necessary. Renewable resource such as water should be used well below its renewing capacity. The reduction of food consumption is hard but environmental loading of agriculture can be reduced by proper food choice. Repetitive use or long-life use is appropriate for industrial products or buildings. Life cycle assessment is an effective tool for evaluating the effect of such use. Information and communication technology can reduce resource and energy consumption through replacing goods with services

Biomass is renewable resource and carbon-neutral energy which does not emit artificial carbon dioxide. However, its use varies depending on its characteristics. Wood is suitable for burning whereas food waste or sludge is suitable for generation of biogas. Heat recovery from solid waste incineration and from domestic wastewater is effective in district heating system in dense urban area. Matching of spatial distribution of heat source and demand is necessary to make such system effective and feasible. The hinterland often supplies food and other resources to the urban area. The linkage between urban area and its hinterland should be promoted for circulating the resources including biomass.

The urban form is a factor influencing energy and resource consumptions. Compact city is a common policy in many countries. This may decrease the energy consumption by implementing public transportation and more apartment houses. Compact city requires smaller network of infrastructure such as road and water supply and drainage. This eventually decreases the resource and energy consumption and cost.