

City Talk



BUILDING DESIGN IS KEY TO ENERGY SAVINGS

Continuing my theme on the Hong Kong climate action plan, let me now focus on energy savings and green buildings.



Nuts and bolts

Edmund Leung

The plan sets a target of reducing energy use in commercial buildings by 15 to 20 percent by 2035, with an ultimate goal of 30 to 40 percent in the longer term. Likewise, for residential buildings, the equivalent target will be 10 percent to 15 percent, with a long-term goal of 20 percent to 30 percent.

The present energy consumption record shows that 90 percent of the total electrical energy generated is used in buildings, with air-conditioning as the largest consumer of energy.

As we live close to each other, and modern building design does not provide cross draughts in room, air-conditioning is now of widespread use, not only in the heat of summer, but almost throughout the year.

This phenomenon is especially common in commercial buildings where there is a higher concentration of persons per room.

But even in residential buildings, the use of central air-conditioning has become more popular, as it is perceived to provide a better living environment regardless of outside conditions. As we enjoy a higher standard of living, we also consume more energy.

Gone are the days when ceiling fans were used for ventilation and people wore singlets and shorts at home, sweating as we strove to make it through the day. Some of us would remember our school years when we were sweating in classrooms and using paperweights to secure our papers from flying about, blown by the ceiling fans.

Modern living with air-conditioning come at a price, and the price we pay is a far larger increase in energy use.

To try to substantially reduce energy

will be difficult, as we have already used power-efficient variable frequency air-conditioning plants to reduce power use during part-load conditions. Most people now also understand the good practice of keeping all windows and doors closed when air-conditioning is used, so the potential for further savings will be relatively small.

This points to the need for a major revamp in our building designs. Thermal insulation of buildings must improve.

We should minimize the use of glass curtain walls. They may make the building façade look elegant and save a little bit of wall thickness to increase room sizes, but the low thermal efficiency means a lot of heat energy (or cooled air) is lost through the building envelope. What we gained in living space we pay in the form of running costs in increased energy use.

Instead, we should use thicker concrete walls, smaller windows with double-glazing, and better door seals.

Future office buildings should also adopt a similar design, and with sunshades over west-facing windows to reduce the effect of sunshine in rooms.

Such changes not only require conceptual changes in architecture, but also in our willingness to trade looks and space efficiency for lower energy.

Energy savings come at a price.

Whether we are willing to pay that price depends upon the determination of the whole city to resolutely focus on energy reduction, including our government, who must modify the building ordinance requirements to encourage such improvements.

Veteran engineer Edmund Leung Kwong-ho casts an expert eye over