

Innovation makes power bill hikes cool for some

Wednesday, December 07, 2022

Recent announcements that electricity tariffs would be increased have caused concern among consumers.

However, I personally think the hikes are inevitable given recent worldwide political developments but that their impact on Hong Kong is less than that compared to many foreign cities.

With Hongkongers paying power bills that amount, on average, to about 3 percent of their total spending, this increase should be a small burden to them.

But for commercial operations with large air-conditioning loads, the costs could involve relatively larger sums.

I therefore found it interesting and useful when I had the opportunity to visit the Build4Asia Exhibition last month and was shown an innovative air-con system developed by some Hong Kong building services engineers.

This team developed a novel brushless DC motor to drive the air-handling units of commercial air-con systems, substituting the traditional AC induction motor.

Using proprietary electronic control algorithms, sine wave current configuration is fed to this new motor, instead of the traditional BLDC square-wave current.

This sine-wave current format can significantly improve the conversion of electricity to mechanical turning force and has the demonstrable ability to reduce power consumption by up to 65 percent.

To readers who are not technically minded, what this means is that, by injecting a more efficient form of electricity current to the motor to reduce energy wastage (which turns to heat and is expended to the atmosphere), the air-con fans that drive the cooled air to the room will run at significantly lower costs.

A further advantage of this new motor is that because the size of its frame is similar to that of traditional induction motors, and the electronic control can be remotely mounted, retrofitting is an easy operation.

These new motors are already being tested in some public and commercial buildings, and if proven, will come as most welcome news to us.

Another innovation is the use of plate tube evaporative condenser chillers, which claims to reduce energy by about 15 percent compared to conventional water-cooled systems and 35 percent for air-cooled systems.

The principle applied is to use water injection to cool the air-con condenser coils.

The application of latent heat significantly improves cooling efficiency, and using a closed system, any water that has evaporated is condensed and collected for recirculation, without causing undue waste to freshwater consumption.

These two innovative systems, if properly proven and widely applied, will help us to achieve the goal of reduced electricity consumption and greenhouse gas emissions.

As responsible citizens, we all have a duty to reduce greenhouse gas emissions.

We must cultivate a better discipline in saving electricity by switching off lights and all appliances when they are not required or not in use and minimizing the use of air-cons by setting appropriate temperatures on the thermostats.

Not only do we then achieve the goal of reducing pollution, but we can also save on energy costs.

While engineers continue to seek out innovative ways to improve efficiencies in the machines that we use, the personal initiative that we take in adopting only the most efficient equipment and the discipline we show in using them will help us to achieve these goals without unduly sacrificing comfort and convenience.

Veteran engineer Edmund Leung Kwong-ho casts an expert eye over features of modern life