Session 3 Questions from the Mobile App

1. This question is for Mr. Mikoshi. Is it true that for inverter AC, user need to use it for at least 8 hours in order to fully experience benefit the energy saving feature of Inverter AC?

   An inverter optimizes the energy consumption at part load, however, the efficiency of the operation goes down steeply at very low loads. So, there is no general rule, it all depends on the design parameters. At lower loads, inverters can still provide the required comfort while non-inverters cannot. The “8 hours” referred to in the question may have been confused with the first 8 hours of operation in the whole life time of the equipment. This 8 hours is valid for both inverter and non-inverter equipment.

2. If O&M is so important, why is it not top of the pile in all countries? Is it cost, is it payback, is it paucity if good training materials or organisations? What are some good case studies that can be shared?

   Installation, operation and maintenance is important and can deliver substantial saving. It should have maximum attention in all countries but it also very much depends on the consumers and what they are willing to spend on installation and maintenance of the equipment. So, this cannot be directly related to national initiatives, or the paucity of good materials. Case studies will exist, but where and how these studies need to be shared is the question.

3. How you monitor the leak rate in the installations?

   Measuring the performance, the COP, temperature against power consumption will give a good impression of the quality of the installation (that is, that there are no leaks).

4. What’s the best type of leak detection machine?

   This depends on the type of refrigerant used. For HFCs and such refrigerants many types of leak detecting equipment exist.
5. How we could predict the leaks?

One cannot predict leaks: if that was possible, leaks could be avoided completely. Leaks can occur in heat exchangers if the welding or soldering operation in heat exchanger manufacturing is not well tested, leaks can be predicted if a piece of equipment is assembled in the field with critical positioning and connecting piping of components.

6. Standard is ISO 14903 for tightness of certain joints. The other joints and equipment tightness is under ISO 5149.

Correct

7. What is your estimation (percentage) of existing equipment not properly served? What can Governments do to improve servicing?

Nobody can give an estimation of the global percentage. It will depend on the consumer whether he wants to invest in servicing, on the existence of national (certified) servicing organisations, and whether or not there are logbooks for any servicing required in a country, which are checked regularly by national bodies.

8. Over the life of a system/equipment, which is more important for the energy efficiency of a system, the proper maintenance or the refrigerant?

The choice of the refrigerant is only made once, and makes a difference of 5-10% at maximum, or +/-5% around an average refrigerant efficiency. Proper operation or maintenance could make a difference of more than 10% compared to not well operated and maintained equipment.

9. At what point should an owner of a refrigeration equipment know there is a leakage in the equipment to avoid losing food to waste?

If the cooling or refrigeration temperature and running time, or power input of the compressor is regularly measured, deviations of more than 5-10% give reasons for maintenance including leak checks, so that food waste can be avoided. The value of food wasted can be easily much higher than the maintenance and leak check costs.

10. Reducing or avoiding leak, are there measures to win this battle considering the fact that we are confronted with the interest of energy providers and business oriented technicians who would wish to have interaction with RAC to keep business booming?

The question that one can ask here first is whether energy providers are interested in not-well functioning equipment, and whether business oriented technicians are only
interested in filling up refrigerant in order to sell more refrigerant in a “booming business”? The increasing cost of refrigerant means that owners of equipment will not allow to just charge refrigerant, and will ask for equipment tests or screening. That will be the proper and good job for servicing technicians.

11. Do low cost sensors and digital technologies now allow us to do real time monitoring at low cost in a way that was not possible before?

More is possible with sensors and with all kind of measurement apparatus than what was possible years ago. For the RAC equipment, this can be restricted to a very limited number of measurement points to monitor the functioning. New technologies for data sampling and data interpretation are steadily improving, which means improvements in the ability for early detection of malfunctioning of equipment or appliances.