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Position Paper on Inspection and Surveillance Activities

Socio-Economic benefits of coordinated, systematic building and facility inspection and market surveillance activities

In a nutshell

The introduction of systematic building inspections, focusing on the operational safety, the adherence to building regulations, and the proper maintenance of the HVACR systems on existing building stock in the country, the inspections of cold storage and transport facilities, as well as general market surveillance activities to reduce counterfeit and potentially hazardous refrigerants and adherence of HVACR products to federal law bears numerous valuable benefits for socio-economic development, energy conservation and health and well-being of the population.

Background

The HVACR (heating, ventilation, air conditioning, refrigeration) industry, supplying all the necessary equipment for space and process cooling, air distribution and filtration, as well as cold storage and refrigeration is of vital importance to the country's development and the well-being of its inhabitants.

This importance reflects in several ways:

- An estimated 70% average of a building's energy consumption is attributed to its cooling and ventilation requirements.
- Indoor Air Quality has a significant effect on health and well-being of the population, given that people spend 90% of the time indoors.
- Cooling and refrigeration equipment are crucial in the food supply chain to ensure the provision of uncontaminated, fresh, and non-infectious food to consumers.
- HVACR equipment play an essential role in fire safety, due to its capabilities to suppress smoke development through proper ventilation, but also constitute a fire risk when not handled in a proper manner.
- Refrigerants needed to provide the cooling function of any equipment pose environmental, health and fire safety risks.
- In water cooled applications, the risk of legionella is widespread and needs to be addressed properly.
- The operational safety of such systems depends heavily on product quality and safety.

These points highlight why special attention should be given to the production, installation, operation and maintenance of any HVACR equipment in the region. In the following, each aspect is elaborated further by showing the potential hazards, waste, and improvement potential.

Energy Efficiency

While standardisation bodies like ESMA and ADQCC are working on implementing minimum energy performance requirements (MEPS) for some product ranges in the HVACR sector, and the building sector is trying to give such considerations to new build stock, the industry is missing a complementary approach where buildings have to undergo continued inspections to ensure that

energy saving measures are kept in place, updated and monitored over the life span of a building, rather than only at its initial commissioning.

Experiences made in the field and studies in comparable environments have indicated that, through proper maintenance of the HVACR installations, the energy saving can reach an average of 28%. This figure alone would justify more attention to maintenance and operation aspects of the existing build stock.

Indoor Air Quality (IAQ)

IAQ has become an increasingly pressing issue. Studies by WHO and other organisations regularly highlight the impact of air pollution in buildings on the efficiency and health of occupants. While the impact of bad IAQ on children is higher than on adults, this issue affects almost the entire population. Asthmatic diseases, allergies, cancer and a host of other illnesses are directly linked to compromised air quality. While a complex matter in itself, one of the most vital components of maintaining indoor air quality lies in proper filtration and ventilation and a sufficient supply of fresh air.

Using the correct types of air filters, their maintenance and timely replacement is critical not only from a health perspective, but also has a significant impact on energy consumption.

Food Safety and Cold Storage

The relevance of ensured and continued cooling/refrigeration during the whole supply chain of fresh products, especially meat and dairy, is well known. This includes accountability and control mechanisms from production to the point of sale.

The UAE is yet lacking a comprehensive set of standards and regulations in this area and discussions at municipality level show that the pressure is high. From the point of view of the HVACR industry, being involved in such discussions only at a less prominent level, any regulations focusing on the food supply chain should include minimum standards for storage and transportation facilities, and especially the requirement for recurrent certification to ensure the compliance of critical infrastructure with international and national standards.

Fire Safety

Ventilation systems play a pivotal role in prevention and suppression of smoke development in the event of fire outbreaks, in many cases designed to keep escape routes (staircases) smoke free for a distinct amount of time. However, HVACR equipment itself, due to its electrical components, the functionality to distribute air and thus potentially smoke, and its - sometimes flammable - refrigerants need to be handled with care. Low quality products, inadequate installations, sub-standard maintenance and operation increase these risks drastically.

While the majority of the industry is investing in the quality and safety of its products, this cannot be said for all manufacturers, and apart from that, inadequate installation, design, handling and maintenance make most of these efforts obsolete.

Refrigerants

Refrigerants are gases or liquids used to achieve the thermal energy effects which provide cooling. They are used in air conditioners, chillers, fridges, freezers and many more applications. Depending on

class, chemistry and type, they may be hazardous for the ozone layer, poisonous to people with excessive exposure or flammable: in short, they need to be handled with appropriate care.

Through international agreements on environmental protection, like the Montreal Protocol and following agreements (Paris and Kigali), the international community has implemented a plan to phase out refrigerants with high global warming potential (so called F-Gases), namely HCFCs with their ozone depletion potential as well as HFCs and replace them with alternatives with low global warming potential.

These F-Gases are still widely in use in the UAE. One of the results of the phase out is a significant increase in the price of older refrigerants, as their production will slowly come to a halt. The price hike is an open invitation to counterfeiters, who already infiltrate markets all around the world. Such counterfeit products, due to their unknown ingredients, can potentially result in anything from destruction of equipment, to poisoning maintenance personnel, to even more severe effects (explosions).

Eurovent Middle East sees this phenomenon as a potentially severe risk for health and safety on the horizon for the whole Middle East. Stringent market surveillance would be required to counter this threat, but such structures cannot be developed and implemented overnight.

Legionella

In water cooled applications, especially cooling towers, the problem of legionella is of importance. Legionella find their ideal environment in water between 35 to 55 degrees Celsius and are a common problem in various cooling devices and water piping systems. While adequate water treatment usually annihilates this issue, improper care, poor maintenance, and negligence frequently cause the spread of these hazardous bacteria.

Operational Safety

As with all machinery and electrical appliances, their safe operation depends a lot on the quality of the product. From materials to the quality of the installation, everything adds to or takes from a safe handling of the equipment. Adding to this are the quality of guidelines, maintenance instructions, optical and acoustic warnings, the training and education of service personnel, the cleanliness of the operational environment, and many more.

Inspection and Surveillance Programs

Addressing the above issues in an effective way requires an integrative approach by government, municipal authorities and the industry.

Definitions of Inspection and Surveillance

In this paper, inspection is understood as a control program for recurrent checks on adherence to rules and regulations, while surveillance is understood as a continuous monitoring of products placed on the market and their compliance with standards and regulations.

Building Inspection

Building inspection should be recurrent (2-year intervals) and include an overall assessment of the condition of the building and its HVACR infrastructure. It should address the following points:

- Is the HVACR system maintained regularly?

- Is the HVACR system working correctly?
- Is fresh air supply ensured?
- Are air filters replaced regularly?
- Which refrigerants are in use?
- Bacteriological sampling of air ducts, water containers, etc.
- Assessment of maintenance and operation guidelines
- Assessment of documentation procedures
- Assessment of the operational safety environment

Market Surveillance

Market surveillance, focusing mainly on the products coming into the country or onto the market, as already done in smaller scale, should ensure the compliance of the products to standards and regulations set forth by the normative authorities and work closely with the industry to identify counterfeit products.

A dedicated tool to monitor the refrigerant market is highly recommended.

Data Collection

Both building inspection and market surveillance activities must place emphasis on the collection of data, essential for the further development of regulations. At the moment, no data is available on the overall inventory of HVACR products and their energy consumption. A comprehensive inventory would provide an invaluable tool to the government to better estimate energy requirements and saving potentials.

Furthermore, such data would provide valuable information for the relevant entities to develop improved regulations and evaluate and adjust current building codes and labour protection laws. If provided to the industry, it would also help various industry sectors to identify shortcomings and define requirements to improve product safety and quality, operational guidelines, as well as training and education of involved personnel.

Requirements

For such inspection and surveillance programs to become efficient and beneficial, a wider range of requirements would need to be defined and met.

Integration

Given that these programs target energy conservation, health hazards, work-, fire-, and food safety, water quality, and the import of goods, they fall under the responsibility of a variety of government organisations, both on federal and municipal level. What might appear as an obstacle, and surely challenges responsibilities and the authority of government organisations, should be seen from an integrative perspective. The expertise from various departments will be an exemplary asset in defining the programs itself. Executed on a municipal level, but within a federal framework, it may either be organised under an existing structure (e.g. Civil Defence), or be developed as its own organisation, which by its nature could serve as a central service organisation to those government bodies relying on depending on inspection and surveillance activities.

Rules & Regulations

The programs have to be built around current rules and regulations (federal and municipal) and may in the beginning mainly serve for data collection and issuing recommendations to building owners and operators. The data collected however shall be used to improve and adjust the regulatory framework and define incentives, fines and other corrective measures.

In close cooperation with different government bodies, this will support coordination among authorities and legislators and benefit joint action amongst them.

Capacity Building

An essential aspect for inspections and surveillance programs will be to increase capacities through specific education and training of manpower carrying out the actual work. The qualification required would include basic understanding of HVACR systems and products and their correct installation and operation. General technical understanding, awareness of the core hazards and risks associated, and knowledge of the main underlying regulations are important as well.

The work would not require higher education, university or engineering degrees, but rather a vocational education level, with recurrent and continuous training. A conservative estimation, taking into account surveillance, the inspection of buildings, and eventually cold transport vehicles, and covering all major cities in the UAE, expects the total number of manpower needed to eventually surpass 1.000 people.

If such programs are expanded into other industries or areas, where inspection is necessary, this figure would increase accordingly.

Benefits

Before summarising the benefits of such programs, one needs to understand the immediate effects of inspection and surveillance.

Effects of inspection programs

The implementation of inspection programs would immediately place pressure on building owners and operators, to look more closely into the maintenance of their HVACR system, which would achieve a fast and positive effect. Developers would mandate their contractors to build and install to higher qualities in order to reduce the costs of maintenance in the future, achieving a beneficial effect on energy efficiency and overall quality.

If incentives are added at some point to award well maintained buildings and sanction those who are neglected, this effect would ultimately quadruple. If the building industry realises that the government does expect proper quality, efficiency, safety and maintenance, they will be forced to place equal attention on these topics as well.

Effects of surveillance programs

On the surveillance side, immediate effects are less likely. Here benefits will come over time, when manufacturers and importers, who are bypassing compliance to federal regulations are identified and sanctioned. The more immediate effect will be the increase of awareness of local regulations and an increase in product registrations and certifications.

In case of counterfeit refrigerants, surveillance activities are crucial for health and safety and should be established with priority. In cooperation with leading refrigerant manufacturers, counterfeit products can be identified, importers and dealers sanctioned and the threat they pose minimised.

Market surveillance is an essential tool to ensure a level playing field for all manufacturers, where every market player adheres to the same rules and follows the same requirements. Thus, surveillance is seen exceptionally positive by the industry and is widely supported.

Energy Conservation

Building inspections, supported by market surveillance, will ultimately lead to a substantial increase in energy efficiency. One study has revealed that with a single maintenance as per the specification of the manufacturer, could achieve an average 28% efficiency increase across 10 existing buildings. Only the announcement of the implementation of building inspection would already result in higher awareness if communicated properly.

Preventive maintenance will become more accepted and applied. If maintenance costs are included in the investment calculation, it will be quickly understood that cheap products may cost more in the long run and investment in higher quality and improved efficiency, ultimately pays off.

An average increase of only 10% in energy efficiency calculated over the whole energy consumption in the building sector would already have significant impacts, for peak load times with less strain on the electrical grid, as well as from a socio-economic perspective of saved energy costs.

Health and Safety

As outlined in the pages above, properly maintained, serviced, designed and installed HVACR equipment has a notable influence on people's health. Higher oxygen levels and proper indoor air quality in buildings would improve productivity, reduce asthmatic and other lung diseases, help with allergies and lower blood pressure.

In the food chain, surveillance would have a significant impact on food safety, reducing food inflicted diseases and improve overall food quality.

The operational safety of HVACR installations, proper guidance and training, clean and safe working environment for those people handling and maintaining such equipment will drastically reduce accidents and injuries.

Economic Impact

Inspections are leading to more maintenance, which itself will result in faster replacement of old, inefficient and broken equipment. This logical train of events is the bottom line when looking at the economic impacts.

At first, it will strengthen the facility management industry and the maintenance and service business, leading to more employment, increase the demand for skilled personnel and definitions of minimum standards for maintenance.

In a second step, a boost of the spare parts business can be expected, providing a better market environment for many dealers and traders and creating a stronger supply chain.

The ultimate result will then be seen in increased and faster replacements of old equipment, more retrofitting and renovation. This has not only a positive effect on the manufacturing side, but also provides additional business to the building industry.

Left aside the economic impacts a significantly lower energy demand would provide, inspections and market surveillance lead to a notable number of positive effects and are an excellent way to strengthen the economy and stimulate economic growth in times of slow-downs or recessions.

Socio-economic Benefits

Inspection and surveillance programs create jobs. By strengthening the business environment for the service, trading and manufacturing industry alike, the demand for skilled and non-skilled personnel will rise significantly. As proper maintenance and installation requires educated and trained manpower, the demand for skilled workers will increase more than for unskilled ones. This means, that these jobs will have to be compensated with higher wages, thus creating improved income opportunities for skilled workers, making it more attractive to work in this field and providing them with better living opportunities

Emiratisation

A major advantage can be secured for the local community, if those people educated and trained to conduct inspection and surveillance tasks will come from the local Emirati community. The existing resources, for example the students enrolled in the vocational school VEDC (Vocational Educational Development Center) in Abu Dhabi can be involved in the training and education of young Emiratis, providing them with interesting job opportunities within government entities and entrusting them with responsibility towards their country.

It should not be overlooked, that such trained and educated people, with experience gained in inspections and surveillance, will be highly valued not only by other government and municipal entities like energy and water authorities, but also in the private sector overlooking projects and leading teams.

Summary

Despite being a complex field, building inspection and market surveillance programs would provide manifold benefits to the economy, the society and the country.

The most significant benefits include:

- Significant reduction of energy consumption
- Providing better Indoor Air Quality to the population
- Reducing respiratory illnesses, easing allergies, and other serious diseases
- Reducing fire and safety related hazards
- Increasing food safety
- Increasing operational safety
- Supporting education and training of people
- Creating significant amounts of jobs
- Providing better job opportunities for Emiratis holding no higher education
- Strengthening the economy

Eurovent Middle East, representing the manufacturing industry of HVACR equipment, strongly recommends taking up this challenge to establish the necessary infrastructure and is happy to provide support, advice and expertise wherever requested.

We are confident that with joint efforts we can succeed to see all these beneficial effects being realised. For the best of the UAE, its economy, the society and its visionary leaders.

This Position Paper reflects the joint opinion of Eurovent Middle East, its members and affiliated organisations. It was written in good faith and expresses opportunities and potentials to the advantage of the UAE and its citizens.



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