

# Assessing Good Service Practices in India's Air-Conditioner Servicing Sector

## Key Findings From A Survey Of Service Technicians

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India is currently in the process of phasing out hydrochlorofluorocarbons (HCFCs) and transitioning to hydrofluorocarbons (HFCs) in all sectors in commitment to the control measures under the Montreal Protocol on Ozone Depleting Substances. HFCs are commonly used as refrigerants in cooling applications like air-conditioners and refrigerators. However, even though HFC are not ozone depleting, they have extremely high global warming potential. In 2016, the Kigali amendment to the Montreal Protocol have made HFCs also subject to control measures. From 2028, India will have to phase down HFCs and move to climate-friendly refrigerants.

In the run-up to the Kigali amendment, much of the attention has been on finding suitable alternatives and technologies for HFCs. However, focusing on the practices of air-conditioning technicians who install and repair air-conditioners and refrigeration systems is crucial to reducing HFC consumption. Globally, the servicing sector uses as much as 40% of refrigerants during servicing, which can be greatly reduced by good service practices, use of tools and regular servicing of equipment. With India's air-conditioning (AC) and automobile market's set for high growth, addressing deficiencies in the practices of the service sector can significantly minimise HFC emissions and its consequent carbon footprint.

CEEW's ongoing research on the AC servicing sector analyses servicing practices in the residential (RAC), mobile (MAC) and commercial (CAC) air-conditioning sectors to identify potential policy interventions

to reduce HFC consumption during servicing. The analysis is based on primary survey data, focused group discussions (FGDs), interviews and secondary data through literature review. This policy brief presents some of the highlights from the survey and FGDs.

### Survey Methodology

The survey was conducted in three cities across India—representing different climatic zones, populations and geographical areas. Due to the lack of a sampling frame, non-probability based sampling methods was used: quota sampling was used to ensure some diversity in respondents along with snowballing method to identify technicians.

The sample size for the survey was a total of 642 respondent split across the survey locations and sectors as under:

	Delhi	Jaipur	Madurai	Formal	Informal	Total
RAC	96	79	57	97	135	232
MAC	98	78	57	67	166	233
CAC	74	58	45	102	75	177
<b>Total</b>	<b>268</b>	<b>215</b>	<b>159</b>	<b>266</b>	<b>376</b>	<b>642</b>

Source: CEEW Analysis (2017)

The survey questionnaire focused on:

1. Establishing background demographic information about the respondents;
2. Five major good servicing practices (GSPs): leak testing before refrigerant recharge, calibrated

charging (by the appropriate method for the sector), brazing of tubes/flaring of parts, flushing without refrigerant and recovery of refrigerant during servicing;

3. Level of knowledge of technicians on energy efficiency, environmental impacts of refrigerants, recycling, reclamation and alternative refrigerants;
4. Access to tools and equipment.

## What does the Indian AC service sector look like?

The service sector is comprised of many types of enterprises:

- Self-employed individuals and own-account or unregistered enterprises, together known as the “informal” or unorganised sector;
- Service centres authorised by the manufacturers (who provide services for goods under warranty or have access to official spare parts) and multi-brand service centres which are registered enterprises (which are not authorised by the manufacturers), together known as the “formal” sector.

It is difficult to estimate how many service technicians are in India (across all three sectors). The most commonly used estimate for the RAC sector is 200,000 technicians which is the estimate used by the Indian government based on existing AC stocks in the country.<sup>1</sup> However, some industry sources believe that it might be an over-estimation.<sup>2</sup>

In the MAC sector, a CII study (2010) estimated around 585,000 persons employed in 2010, of whom about 63% were estimated to be mechanics.<sup>3</sup> According to the Federation of Automobile Dealers Association (FADA) however, the total number employed in automobile servicing are around 2 million, of which approximately 50% are in the informal sector.

The CAC sector has some overlap with the residential air-conditioning sector is estimated to be largely formal though there are no estimates available on the number of persons employed.

## SIGNIFICANT RELIANCE ON THE INFORMAL SERVICING SECTOR

The formal sector does not have a sufficiently large servicing network to meet the needs of the entire population. This is especially true in smaller towns and rural areas. As a result, this servicing gap is filled

by the informal/unorganised sector. While all major manufacturers offer free or reduced prices on services for 1-4 years on their products, many customers do not return to authorised service centres for servicing needs once the equipment is no longer new due to higher costs associated with these centres. For cars, it is estimated that only 50% of customers return to official service centres<sup>4</sup> once the cars no longer qualify for free servicing. As a result, a majority of older equipment rely on services from the unorganised sector, many of whom have no formal training in the repair and servicing of equipment. In the RAC sector, it is estimated that far fewer people return to authorised service centres for servicing after the warranty period has expired, with customers relying on existing informal networks. For the CAC sector, it is estimated that many customers enter into annual maintenance contracts (AMCs) with enterprises to cover their routine servicing requirements.

## FRANCHISEE-BASED MODEL FOR AUTHORISED SERVICE CENTRES

Authorised service centres in all sectors are largely operated by dealerships and franchisees, rather than being directly managed by manufacturing companies (a few companies like TATA Motors operate their own service centres). Some manufacturers have detailed pre-requisites including mandatory equipment, training for technicians and other servicing practices that are part of their global corporate practices, while others have fewer requirements. Furthermore, each company has its own audit system and therefore, it is difficult to ascertain the level of compliance to standard operating procedures by the authorised centres.

## SKILL TRAINING IS AVAILABLE TO SERVICE TECHNICIANS

While many technicians are trained through apprenticeships or learn through trial and error, there are some avenues of formal training available:

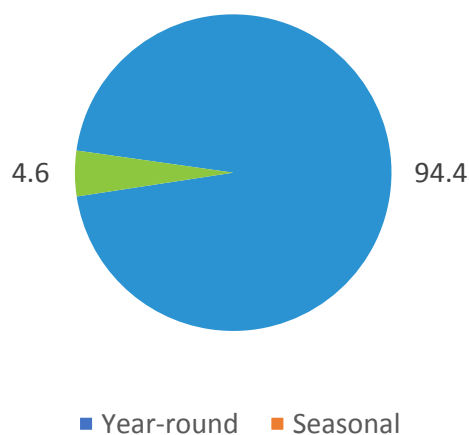
- Industrial Training Institutes (run by private companies and the government) which provide training and diplomas in electronics, refrigeration and automobile management among other subjects. There can be significant variation in quality of training and practical skill development. That said, it may be more accessible than university education for many, especially in rural areas.

- National Skill Development Council and its Sector Skill Councils (Electronic and Automobile Skill Development Councils) run short training programmes for technicians. Both RAC and MAC servicing skills have National Occupational Standards specified by the SDCs.<sup>5</sup> However, technicians are not mandated by law to meet these skill standards in order to be employed.
- Companies also impart training to their technicians. These trainings last from anywhere between a few days to a few weeks. Many companies also organise re-trainings, especially for newer technologies.

## What are the practices and awareness of Good Service Practices (GSPs) of service technicians? Results from the Survey

### MOST TECHNICIANS EMPLOYED IN AC-RELATED WORK YEAR-ROUND

AC technicians working year-round or seasonal



Source: CEEW Analysis (2017)

One of the assumptions of the AC servicing sector, particularly the RAC sector is that the technicians do not work year-round in the sector. However, in the survey over 90% of technicians, across sectors and across formal and informal enterprises work year-round<sup>6</sup> in AC servicing.

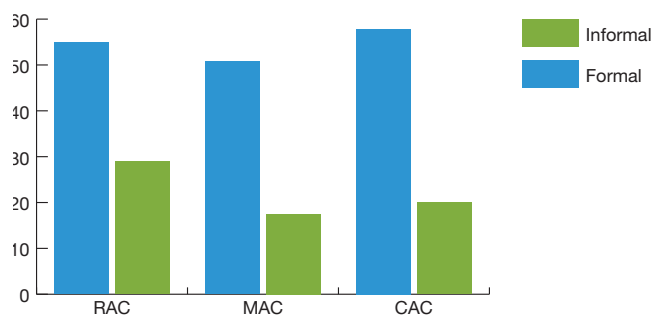
Informal sector technicians reported that servicing ACs in offices and commercial enterprises (where room ACs are installed) went on from February till October every year (roughly 9 months). In the residential sector, servicing of ACs went on for around 6-7 months. In the remaining months, some technicians reported that AC installation and repair work

was available while others reported that other refrigeration-related work like repair of chillers, refrigerators, etc was available year-round. Some also reported returning to their villages during the lean season.

### 36% OF AC TECHNICIANS HAVE RECEIVED TRAINING IN AC SERVICING

AC-related training, through Industrial Training Institutes (ITIs), government skilling programmes or companies has benefitted technicians working in the formal sector, rather than the informal sector, with far greater formal sector employees trained. Many technicians stated that having an ITI diploma is considered a pre-requisite for joining authorised service centres. However, the survey results show that training alone does not have an impact on the likelihood of following GSPs.

% of technicians trained in the formal and informal sector

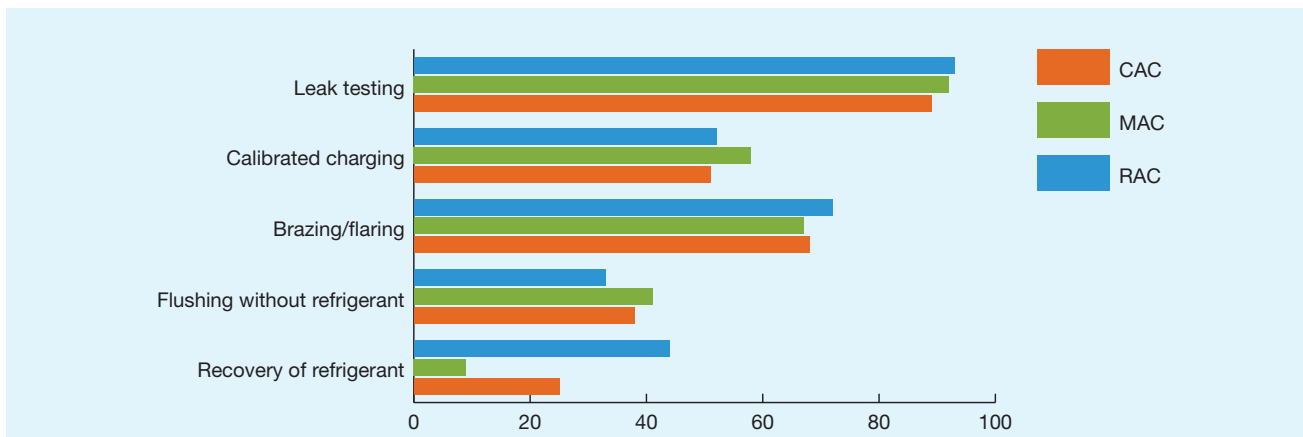


Source: CEEW Analysis (2017)

Several technicians reported dissatisfaction with the low barrier to entry for AC servicing. They expressed the belief that many non-trained technicians start servicing even though they have no training and therefore do not adhere to GSPs. Technicians outside the formal sector also reported some difficulty with picking up servicing practices for new technologies, especially in the MAC sector due to the increasing computerisation involved.

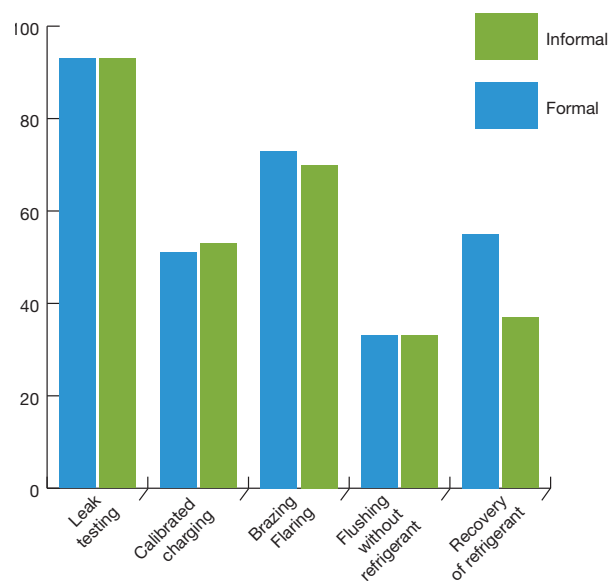
### NEARLY ALL TECHNICIANS FOLLOW SOME GSPs

Nearly all surveyed respondents reported conducting **leak testing before recharge**. Leak testing in RAC and MAC requires no tools and can be done with soap-bubble solution. Similarly, a high percentage of people reported **charging by weight** and **brazing/flare-ing**, where the necessary equipment is easily available and relatively inexpensive.



Source: CEEW Analysis (2017)

However, **flushing without refrigerant** and recovery of refrigerant are done by less than half the surveyed respondents. Flushing of the AC system is done to remove impurities and contamination. Good practices require flushing to be done with nitrogen, however, previously flushing used to be done with virgin refrigerant and this is a practice that has continued. During the FGD sessions, participants reported that this practice has considerably reduced in the MAC sector due to the rise in cost of refrigerant and that the cost of nitrogen is less than R134a. However, from the survey results it is clear that the practice continues in all sectors, possibly due to the lack of availability of nitrogen or lack of awareness among technicians.

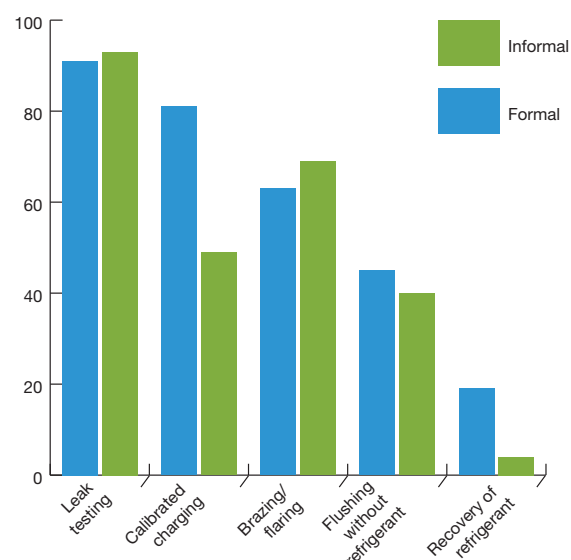


Source: CEEW Analysis (2017)

**Recovery of refrigerant** is not well understood or followed in the servicing sector. In the RAC sector, many reported that recovery is only done when there is still a significant quantity of refrigerant remaining in the system. If there is only a small quantity, it is vented out. This is done primarily as a cost saving measure. Some respondents believed that recovery is not viable for small enterprises and is only done by larger enterprises.

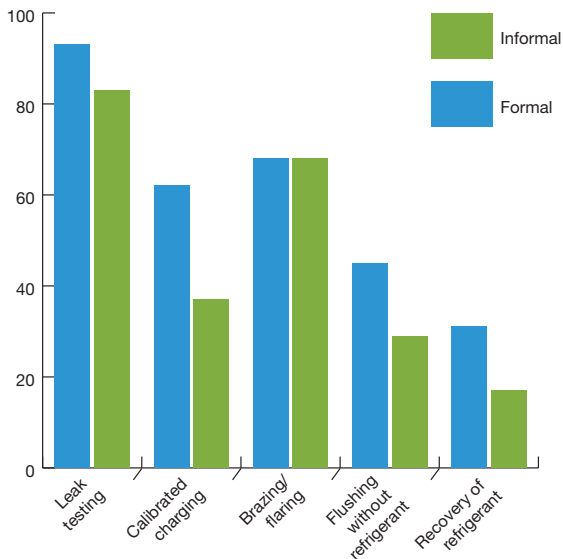
### MORE ADHERENCE TO SOME GSPs IN FORMAL SECTOR THAN THE INFORMAL SECTOR

Among the surveyed respondents, a greater percentage of formal sector respondents adhere to GSPs than those in the informal sector, especially for some practices like recovery (in all sectors) and calibrated charging of refrigerants (in the MAC and CAC sectors). Some practices like leak testing and braz-



Source: CEEW Analysis (2017)

ing/flaring of parts are being followed by a majority of technicians in the formal and informal sectors (across all sectors).

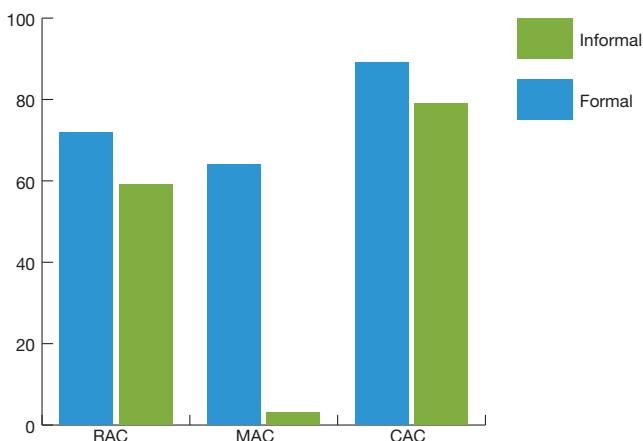


Source: CEEW Analysis (2017)

The reasons for some GSPs being followed more in the formal than the informal sector may be due to better access to equipment, training and standard operating protocols mandated by manufacturers even though there may be no profit from such practices. In addition, some manufacturers require service centre operators to mandatorily install and operate certain equipment (like recovery units in MAC service centres) which may explain the better service practices. However, there is need for further analysis to understand this link between formal sector and GSPs.

### OWNERSHIP OF TOOLS AND EQUIPMENT IS NOT NECESSARILY AN IMPEDIMENT TO FOLLOWING GSPs

Across all three sectors, far more formal enterprises own recovery equipment than the informal sector, with the greatest disparity being in the MAC sector. The number of enterprises with vacuum pumps is greater among all the sectors (even among informal sector technicians), while Recovery & Recycling unit ownership is extremely low.

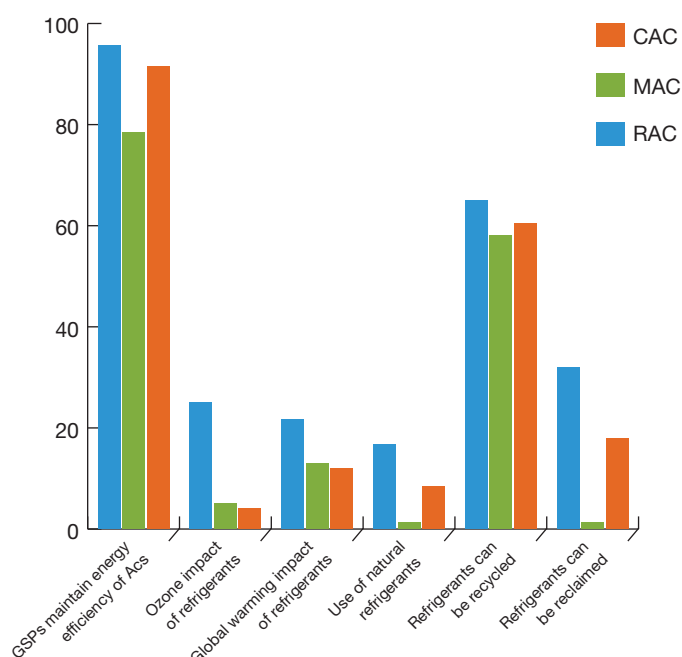


Source: CEEW Analysis (2017)

It is crucial that the number of technicians who have reported that they recover refrigerant during servicing are considerably less than those who own recovery units, suggesting that the lack of equipment may not be the primary reason for not recovering refrigerants.

Industry experts have opined that some of the locally manufactured servicing tools like recovery units are of extremely poor quality and may therefore not function as required. This may be an impediment to greater uptake of recovery during servicing.

### KNOWLEDGE ABOUT REFRIGERANTS, ENVIRONMENTAL IMPACTS, AND THE BENEFITS OF RECYCLING AND RECLAMATION IS LOW



Source: CEEW Analysis (2017)

While most of the surveyed respondents were aware that proper servicing practices would maintain energy efficiency of the equipment, many were unaware of other issues like natural refrigerant alternatives to commonly used refrigerants, environmental impacts of refrigerants and reclamation of refrigerants. Even though Jaipur had a functional reclamation centre till recently, only a small percentage of the respondents from the city were aware of the practice.

Many technicians, especially in the RAC and CAC sectors were aware of recycling of refrigerants. FGD participants stated that this practice is only useful for large enterprises with high usage of refrigerants. Portable R&R units were not seen as feasible for RAC technicians. With regard to natural refriger-



ants, RAC technicians were more likely to be aware of hydrocarbons due to its now-ubiquitous use in domestic refrigerators.

Several technicians reported that they became aware of environmental impacts of refrigerants (though many said they did not know what exactly the impacts were) due to the previous phase-out of CFCs and HCFCs. However, many were also of the opinion that HFCs which replaced the older refrigerants had no environmental impacts since they were the alternatives. There was no awareness of the Kigali amendment and the upcoming phaseout of HFCs in the next decade.

For technicians, the main sources of information about refrigerant alternatives and new technologies are proprietors of their respective organisations, spare parts dealers and other colleagues.

### FEES FOR SERVICING IS LOW, ESPECIALLY FOR INFORMAL SECTOR TECHNICIANS

In the RAC sector, 98% of informal technicians earn less than INR 600 per AC for servicing, while a fifth of technicians earn less than INR 300 per AC. In the formal sector, less than 80% earn less than INR 600 per AC while the remaining earn over INR 600 per AC (going up to INR 800).<sup>7</sup>

87% of the informal sector in CAC earn less than INR 600 per AC while only 52% of the formal sector earn less than this. In the formal sector, remuneration went as high as INR 1500. The reason for this may be due to sampling bias, as informal sector technicians tend to service only packaged ACs in the CAC sector and not large-scale chillers, which require greater manpower and expertise.

The MAC sector showed the greatest disparities in fees earned during servicing between the informal and formal sectors. 66% of the informal sector earned less than INR 500 per car while only 48% of the formal sector earned less than INR 500 per car. Several respondents in the formal sector reported fees as high as INR 4000 and more. This may be because many of the enterprises that can charge such high fees tend to cater to high-end automobile models.

Many technicians from all sectors reported that there is some reluctance from customers to pay very high

fees for servicing and would prefer to use a non-authorised service centre or an informal enterprise for servicing if the fees charged are low. Some technicians also reported that many customers are suspicious of what seem like complicated or unnecessary servicing procedures.

## Key insights from the survey

This survey lays the groundwork for further research and provides many useful insights on policy development for the service sector. Some caution should be used while generalising the results of the survey to the entire target population, since convenience sampling method was used and the sample set was chosen only from three cities in India. Based on the initial analysis, some key insights are:

1. Expansion of training and skill development programmes, while important, are not sufficient on their own. Even though various government bodies like the skill development councils and ITIs are training hundreds of people, the quality of the training provided is not consistent and not in keeping with new technologies. Furthermore, many trained technicians do not adhere to GSPs—other incentives are also necessary to improve service practices.
2. Many technicians who are aware of GSPs do not use them because of the lack of incentives to do so – lack of knowledge, training and equipment are not the only barriers to GSPs. Increasing informalisation in the country, including in the formal sector is an issue of concern as these low-paid workers would then have greater incentive to cut corners (keeping servicing to a minimum, rather than doing all that is necessary). This is also a concern for the informal sector where technicians are forced to keep their servicing fees as low as possible. Creating stable employment opportunities with benefits or a system that is not commission-based AC servicing, along with provision of training on GSPs may incentivise technicians to minimise HFC emissions.
3. While the formal sector has better adherence to some GSPs, there is still much greater scope for improvement. Manufacturing companies are in the position of mandating GSPs to be followed by their authorised service centres and could in-

clude these parameters among key performance indicators.

4. While technicians decry the influx of non-trained technicians and may support a compulsory certification scheme in theory, there may be a lot of opposition in practice as even highly experienced technicians will have to re-learn many skills. Furthermore, it is doubtful that there is enough training infrastructure to provide such training and testing around the country. If the quality and coverage of the certification programme is low, then it would become another unnecessary barrier to entry that has no impact on reducing HFC emissions. However, if the government opts for voluntary certification instead, some incentives will have to be given to the technicians to obtain this certification. Technicians report have a difficult time charging premium fees due to customers being price sensitive. If the certification scheme is given sufficient publicity and credibility among customers, it may incentivise customers to opt for trained technicians.
5. Technicians report that low customer awareness of GSPs, price sensitivity and need for short turn-around time for servicing affect customer choice of service centre. In the FGDs, technicians stated that that their servicing practices hinges on how happy the customer is and a large part of customer satisfaction has to do with low priced services. Servicing enterprises could offer long-term Annual Maintenance Contracts at discounted prices for customers or extended warranty to encourage them to continue using authorised service centres. Manufacturers could also raise awareness of proper installation and servicing practices when customers purchase ACs/cars and highlight the possibility of increased electricity consumption due to faulty installation/servicing.

## References

- 1 Ozone Cell, Ministry of Environment, Forest and Climate Change, Government of India (2017), “HCFC Phase-out Management Plan Stage II”.
- 2 Discussion with representatives from the Refrigeration and Air-conditioning Manufacturers Association (2017).
- 3 KPGM-CII (2010), “Skills for New Era in Auto Service Sector”. Available at: [www.ciiautoserve.in/document/Skill\\_Gap\\_in\\_Auto\\_Services\\_Sector.pdf](http://www.ciiautoserve.in/document/Skill_Gap_in_Auto_Services_Sector.pdf); accessed 06 Jul 2017.
- 4 Estimate from representatives from Society of Indian Automobile Manufacturers (2017).
- 5 National Occupational Standard codes: ASC/Q1416 and ELE/Q3102
- 6 ‘Year-round’ in the survey was defined as 9 months or more per year.
- 7 Fees exclude the cost of spare parts, refrigerants, etc.

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