

**MOP 31** | MONTREAL PROTOCOL  
ROMA 2019



SERVICING INDUSTRY IN  
AFRICA AND IN OTHER  
DEVELOPING COUNTRIES

Tuesday, 5 November 2019 | 18:00 - 20:00 | Iran room

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How Servicing can impact  
Energy Efficiency in RAC Systems

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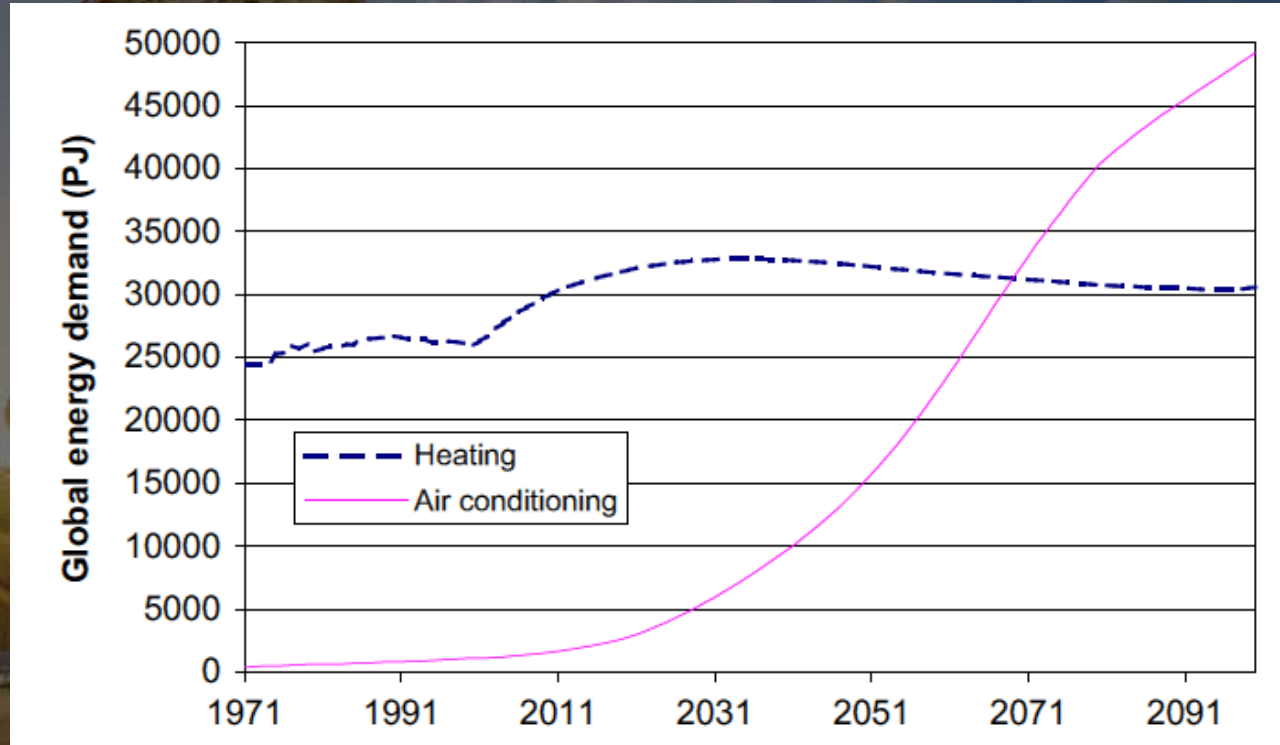
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Global AC demand is going to grow in the next years, due to economic growth and climate change:

- at a rate of 2% p.a. in developed countries
- at a rate of 8% p.a. in developing countries (it means doubling in less than 10 years)



Modeled global residential energy demand for heating and air conditioning  
source: M. Isaac & D.P. vanVuuren, *Energy Policy*, vol. 37, 2009

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- It is widely recognised that residential and commercial RAC equipment can undergo significant loss of capacity and efficiency, depending on how the components are sized, assembled, installed, and subsequently field-maintained.
- According to IIR, “better optimization, monitoring, and maintenance of cooling equipment has the potential to save 30 Gt of CO<sub>2</sub> emissions by 2050 – contributing a further 38% of savings on top of those delivered through the planned phase down of high GWP refrigerants agreed at Kigali”.

source: UNEP-TEAP Task Force on Energy Efficiency report, 2018

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- Improving servicing (which includes both installation and maintenance) can be used to achieve EE as a result of better practices.
- Table provides a compilation of data made by the International Energy Agency (IEA) from several manufacturers that identified the most common faults resulting in EE degradation.

	Fault	Occurrence as % of total faults
The most common faults	Fan	26%
	Control and electronics	25%
	Temperature sensors	16%
The costliest faults	Control and electronics	23%
	Refrigerant leakage	17%
	Fan	15%

*Energy efficiency degradation for air-to-air heat pump due to poor installation and maintenance*  
source: UNEP-TEAP Task Force on Energy Efficiency report, 2018

## BENEFITS ACHIEVABLE THROUGH BETTER SERVICING

- ✓ Reduced energy costs;
- ✓ Improved safety by eliminating risks;
- ✓ Better temperature control and thermal comfort for occupants;
- ✓ Improved occupant productivity by maintaining a good indoor environmental quality;
- ✓ Deferred capital expenditure for replacement and repair cost by extending the useful life of equipment;
- ✓ Compliance with regulation on minimum efficiency requirement for both new build and existing buildings.

source: UNEP-TEAP Task Force on Energy Efficiency report, 2018

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Improvement	Measures to be taken	Effect on Rated EE	Maintenance Cost Level
Appropriate refrigerant and oil charge	Check charge periodically and refill up to the recommended levels	Up to 50%	very low
Air recirculation into condenser	Reduce recirculation by cleaning filters and removing obstacles	Up to 25%	very low
Increase air flow through the evaporator	Cleaning filters and removing obstacles	Up to 10%	low
Adjustment of temperature sensors	Check temperature sensor; correct of change sensors	Up to 15%	low
Adjust thermostatic expansion valve (TEV) settings	Check and make set point adjustments	Up to 10%	medium
Condenser pressure control	Check and make set point adjustment	Up to 10%	medium

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**THANK YOU**  
for your attention

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