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# **An introduction to the Kigali Amendment: Insider insights**

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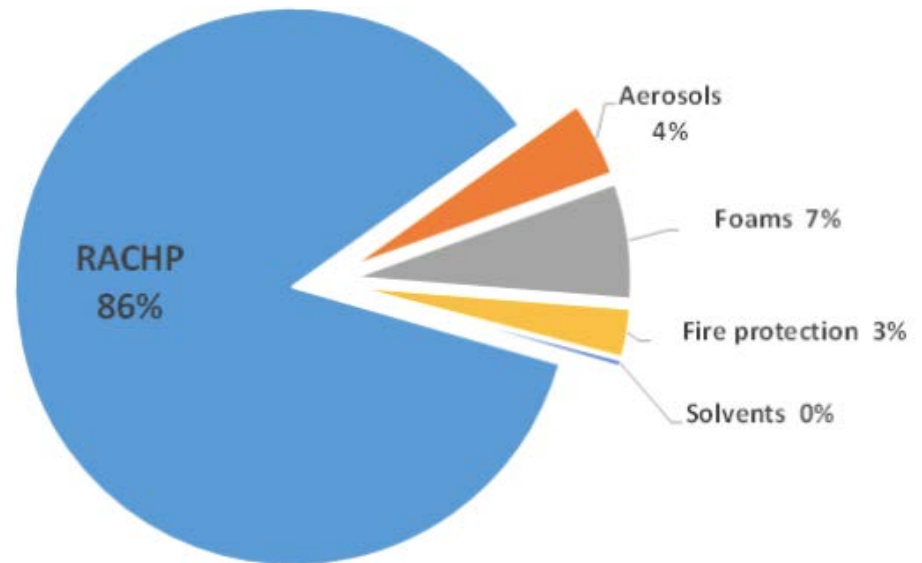
# Adoption of the Kigali Amendment

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- In October 2016, the Kigali Amendment was adopted by all Parties to the Montreal Protocol
- HFCs are added to the list of controlled substances including CFCs and HCFCs
- HFCs have replaced many CFCs and HCFCs and allowed their phase-out.
- Under the Kigali Amendment, the global use of HFCs will be cut by roughly 85% before 2050.

# Global warming potentials (GWP) and applications of HFCs

GWPs and ODPs of some common refrigerants			
Most of the commonly used fluorocarbons are very powerful greenhouse gases			
Type	Gas	GWP <sup>2</sup>	ODP <sup>3</sup>
ODS	CFC-12	10 900	1.0
	HCFC-22	1 810	0.055
HFC	HFC-404A	3 922	0
	HFC-410A	2 088	0
	HFC-134a	1 430	0
	HFC-32	675	0
HFO	HFO-1234yf	4	0
Natural	Propane	3	0
	CO <sub>2</sub>	1	0



Markets using HCFCs and HFCs, 2012  
(% tons CO<sub>2</sub>eq – GWP-weighted)

RACHP = Refrigeration, air conditioning, heat pumps

# Low GWP refrigerants – technical considerations

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- Some low GWP refrigerants are flammable
- High ambient temperature consideration:
  - more refrigerant is needed for cooling
  - higher load of flammable refrigerants
- Refrigerant choice and its impact on energy efficiency
  - The refrigerant choice impacts the energy efficiency from 5-10%\*

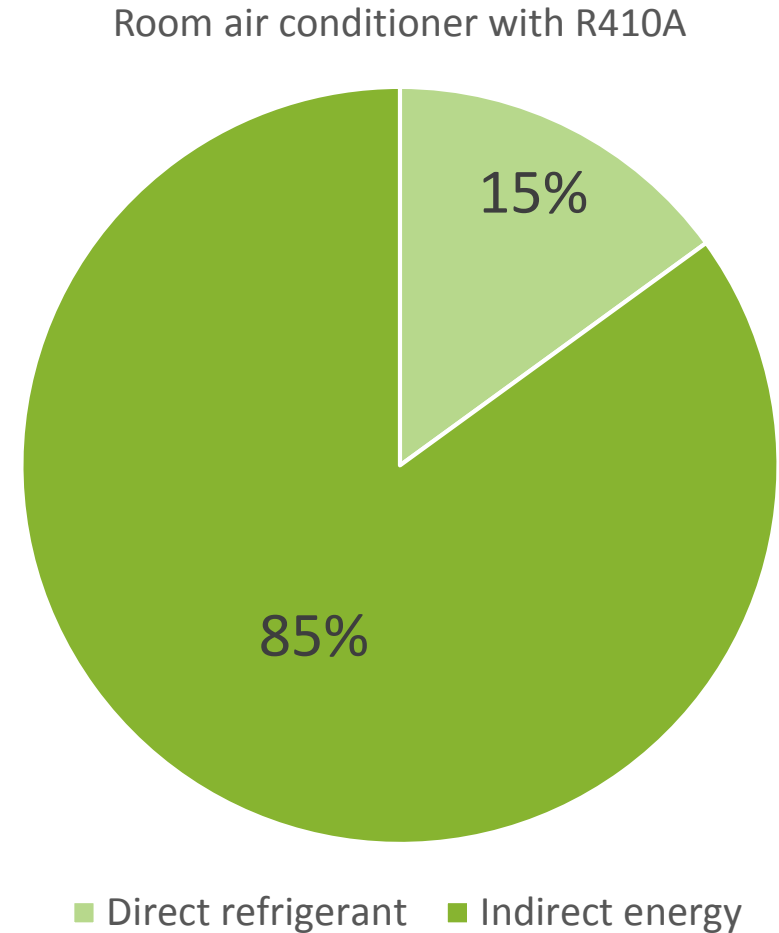
\* Report from the Energy Efficiency Task Force (2018)

# Energy efficiency considerations

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The impact of a product is composed of 2 elements:

- The **direct impact** of the refrigerant (refrigerant leakage)
- The **indirect impact** from the energy needed to operate the equipment (CO<sub>2</sub>eq. depends on the energy mix)



# Challenges and opportunities

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- Unavailability of new refrigerants and technologies
- High costs of new fluids and technologies
- Inadequate safety codes and standards
- Lack of technician skills and training
- Integrate the HFC phase-down with other policy measures
  - Existing plans to phase-out HCFCs
  - Wider national climate change policy
  - Links to regulation on energy efficiency

# Further information on the Kigali Amendment

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Kigali Fact Sheets:

<http://drustage.unep.org/ozonaction/resources/ozonaction-library>

Report from the Energy Efficiency Task Force:

[http://conf.montreal-protocol.org/meeting/oewg/oewg-40/presession/Background-Documents/TEAP\\_DecisionXXIX-10\\_Task\\_Force\\_EE\\_May2018.pdf](http://conf.montreal-protocol.org/meeting/oewg/oewg-40/presession/Background-Documents/TEAP_DecisionXXIX-10_Task_Force_EE_May2018.pdf)

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