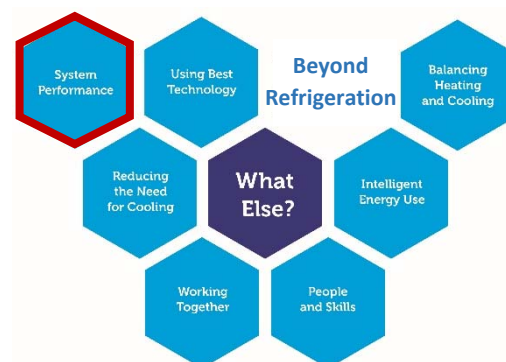


## IOR Beyond Refrigeration - Background

“ Strategies to support users of refrigeration, air conditioning and heat pump technologies to achieve carbon reduction through effective policy implementation, financial incentives, and emissions monitoring. ”



## 4 – Refrigerant Management Strategies

The IOR Environment Working Group has identified a number of key areas for supporting the path to net zero ([www.ior.org.uk/beyondrefrigeration](http://www.ior.org.uk/beyondrefrigeration)). The topic of refrigerant containment underpins many of the critical issues in Beyond Refrigeration template. The issues around containment are expanded upon below together with existing and suggested policy option to support improved practices.

Refrigerants are an essential working fluid for all mechanical cooling and many heat pump-based systems. There is no “ideal” refrigerant – the different fluids have properties that affect the environment including global warming potential, ozone depletion potential, flammability, high pressure, toxicity, dangers of chemical breakdown etc. See the IOR Guidance Note 37 on Selection of Refrigerant and the Policy Brief 3 for recommendations on selecting suitable refrigerant fluids.

This Policy Brief focuses on taking strategic approach to managing the refrigerant in use to reduce environmental impact both direct through leakage during use or at end of life, and indirect through increased energy use of systems running inefficiently whether due to leakage of refrigerant or suboptimal system design.

### 1. Reducing the consumption of refrigerant

<p><i>Our ambition is that policy should support businesses to consider refrigerant containment as a business as well as environmental priority. Changing current “business and usual” purchasing, specification and management practices.</i></p>	<p><b>Policy proposals</b></p> <ul style="list-style-type: none"> <li>✓ Require equipment operators to take a pro-active (rather than re-active) role in managing refrigerant within the systems they operate through regular centralised reporting.</li> <li>✓ Data on refrigerant contained, removed and added is already being obtained through regular F Gas Leak check data.</li> <li>✓ Business should be required to report publicly on how they are using refrigerants and what steps they are taking to improve containment and reduce use.</li> <li>✓ A national register of RACHP assets (over a certain size) is required, with annual reporting of amount of refrigerant contained, added and disposed of.</li> <li>✓ Major refrigerant leak events (80% of system volume) to be reportable to EPA (SEPA)</li> </ul>	<p><b>Possible policy mechanisms</b></p> <ul style="list-style-type: none"> <li>✓ F Gas Regulation revision</li> <li>✓ Climate Change Levy / Climate Change Act</li> <li>✓ Energy Performance of Buildings Directive</li> <li>✓ HSE/EPA/SEPA controls</li> </ul>
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### 2. Achieving Best System Performance

<p><i>Our ambition is that purchasers of new equipment and users of existing equipment should be supported to achieve the greatest possible reduction in energy demand and ongoing use without compromising reliability.</i></p>	<p><b>Policy proposals</b></p> <ul style="list-style-type: none"> <li>✓ It has been proven that systems operating with insufficient (or too much) refrigerant work less efficiently, are less reliable and costs more to service and maintain.</li> <li>✓ Awareness campaign on the impact of improved refrigerant containment practices on system performance.</li> <li>✓ Publish sector benchmarks for containment, with targets to reduce year on year leakage rates (as a percentage of refrigerant in use)</li> </ul>	<p><b>Possible policy mechanisms</b></p> <ul style="list-style-type: none"> <li>✓ National Environmental Legislation to prevent pollution by excessive refrigerant leakage backed up with financial penalties</li> <li>✓ Climate Change Agreements</li> </ul>
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### 3. Making Use of Best Management Practices

<p><i>Technologies are available to support improved management practices that will help equipment operators achieve net zero heating and cooling related to refrigerants.</i></p>	Policy proposals	Possible policy mechanisms
	<ul style="list-style-type: none"> <li>✓ Increase frequency of leak checks for all systems (other than hermetically sealed i.e., small commercial/domestic self-contained units for RACHP) and extend to all types of refrigerant.</li> <li>✓ Real-time monitoring of performance and leakage can already be achieved through remote monitoring technologies. These should be made mandatory for larger systems.</li> <li>✓ All equipment users of medium-large systems should be required to have a Strategic Refrigerant Management Plan in place as part of the statutory Risk Assessment requirements that details how they are managing the refrigerant which they are responsible for and what steps they are taking to improve containment year on year.</li> <li>✓ New systems installed to be subject to a rigorous evaluation at planning stage taking into account design to reduce risk of leakage and implementing refrigerant containment strategies.</li> </ul>	<ul style="list-style-type: none"> <li>✓ F Gas Regulation</li> <li>✓ Enhanced Capital Allowances schemes</li> <li>✓ Building control</li> <li>✓ HSE/EPA controls</li> <li>✓ CDM Regulations</li> </ul>

### 4. Developing the Best People and Skills

<p><i>Our ambition is that everyone involved in cooling and heating systems purchasing, maintenance or operation has adequate technical understanding and responsibility for championing net zero.</i></p>	Policy proposals	Possible policy mechanisms
	<ul style="list-style-type: none"> <li>✓ Mandatory training in the handling of all refrigerants is required. Currently this is only required for HFCs due to their global warming potential but must be extended to cover alternatives such as Carbon Dioxide and other Flammables e.g., Hydrocarbon and HFOs.</li> <li>✓ Awareness training for a minimum number of site staff within each equipment owner operator location so that they know how to manage contractors, what records are required and how to interpret the data obtained for reporting requirements and to improve system operation.</li> </ul>	<ul style="list-style-type: none"> <li>✓ F Gas Regulation to be extended to cover all global warming gases.</li> <li>✓ Building Regulations competency requirements to be extended to specifically cover owner operator knowledge and competency for RACHP systems.</li> </ul>

### 5. What else? Whole System Sustainability

<p><i>Our ambition is that everyone involved in cooling and heating systems purchasing, maintenance or operation has adequate technical understanding and responsibility for championing net zero.</i></p>	Policy proposals	Possible policy mechanisms
	<ul style="list-style-type: none"> <li>✓ National standard for Total Equivalent Warming Impact of system evaluation for benchmarking</li> <li>✓ Supply chain management targets both upstream and downstream.</li> <li>✓ Rigorous processes in place to manage refrigerant removed and disposal at End of life of equipment</li> <li>✓ Embodied Carbon measures</li> </ul>	<ul style="list-style-type: none"> <li>✓ Climate Change Levy</li> <li>✓ Enhanced Capital Allowances</li> <li>✓ Energy Technology List</li> <li>✓ WEEE</li> <li>✓ F Gas Regulation Refrigerant Take Back or deposit and return mechanisms.</li> </ul>

#### Additional information and references

[www.ior.org.uk/realzero](http://www.ior.org.uk/realzero)

<https://www.gov.uk/government/collections/fluorinated-gas-f-gas-guidance-for-users-producers-and-traders#using-or-servicing-f-gas-equipment>

## Our objective is to provide policy makers with

- expert advice from Institute of Refrigeration professionals on effective solutions to aid the move to net zero
- the information needed to ensure that policy decisions take into account the interrelation of heating and cooling needs
- realistic and achievable opportunities, solutions, targets and goals for users in this sector
- the necessary depth of understanding of total life cycle and sustainable operation
- advice for non-technical specialists responsible for high level net zero strategies within BEIS & DEFRA / DFE.

## Background and Scope

- The Institute of Refrigeration (IOR) is the specialist professional engineering charity body for expert individuals working in this sector. It has a global reputation for independent technical advice and innovation. Its members provide services to users of cooling and heating services including manufacturing, supply, installation, service and maintenance, consultancy, and inspections
- Refrigeration, Air Conditioning and Heat Pump (RACHP) technologies are used to provide essential services in food production, distribution, storage and retail, industrial cooling processes in manufacturing, climate control in spaces, such as datacentres, IT rooms, offices, shops, leisure facilities and hospitality, as well as pharmaceutical and healthcare facilities, amongst others.
- Heating and cooling in the UK are estimated to account for 10Mt CO<sub>2</sub>e direct emissions from refrigerant use and 87Mt emissions from energy use to heat buildings.

The sector is estimated to contribute to the UK economy through employment of around 70,000 people directly in manufacturing and service roles. It is estimated that the direct impact of cooling on the UK economy is £43Bn

### IOR Beyond Refrigeration Critical Issues and Ambitions

#### 1. Reducing the Need for Mechanical Cooling and Heating

*Our ambition is that policy should support businesses to consider mechanical refrigeration technology as a last resort instead of relying on "business as usual" purchasing and specification practices. This will mean the need to incentivise widespread adoption of net zero alternatives to mechanical cooling.*

#### 2. Achieving Best System Performance

*Our ambition is that purchasers of new equipment and users of existing equipment should be supported to achieve the greatest possible reduction in energy demand and ongoing use without compromising reliability.*

#### 3. Balancing Heating and Cooling

*Our ambition is that policy will support the use of opportunities currently available to maximise heat recovery, sharing and storage across different business activities using heating and cooling.*

#### 4. Making Use of Best Available Technology

*Our ambition is that the whole sector will rapidly adopt the best available, closest to net zero heating and cooling options as dominant technologies.*

#### 5. Use Energy Intelligently

*Our ambition is for 100% renewable energy and zero carbon energy systems providing maximised efficiency, flexibility, and support grid stability.*

#### 6. Developing the Best People and Skills

*Our ambition is that everyone involved in cooling and heating systems purchasing, maintenance or operation, has adequate technical understanding and responsibility for championing net zero.*

#### 7. What else? Whole System Sustainability

*Our ambition is that everyone involved in cooling and heating systems purchasing, maintenance or operation has adequate technical understanding and responsibility for championing net zero.*

Further policy briefs are planned, and this document will be updated as necessary

Check [www.ior.org.uk/beyondrefrigeration](http://www.ior.org.uk/beyondrefrigeration) for updates