National Legislation on Hydrofluorocarbons

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Contents

1 Introduction

Hydrofluorocarbons (HFCs) are historic replacements for many of the ozone-depleting substances (ODS) now phased out under the Montreal Protocol on Substances that Deplete the Ozone Layer, including chlorofluorocarbons (CFCs), methyl chloroform and halons; they are also common replacements for the hydrochlorofluorocarbons (HCFCs) currently being phased out, particularly in refrigeration, air-conditioning and foam-blowing applications. Unlike ODS, HFCs do not destroy the ozone layer but, like most ODS, HFCs are very powerful greenhouse gases (GHGs) – up to thousands of times more damaging to the climate than carbon dioxide – and their use is currently growing faster than any other category of GHGs.

Accordingly, since 2009 proposals have been put forward to amend the Montreal Protocol to phase down the production and consumption of HFCs. In 2015, four proposals for an HFC amendment were submitted, from:

1. Three North American countries (Canada, Mexico, US),
2. Eight island states (Kiribati, Marshall Islands, Mauritius, the Federated States of Micronesia (FSM), Palau, Philippines, Samoa and Solomon Islands),
3. The EU and its 28 member states, and
4. India.

Declarations issued at meetings of the parties to the Montreal Protocol have indicated that a clear majority of parties support the principles of such an amendment; the 2011 Bali Declaration on Transitioning to Low Global-Warming-Potential Alternatives to Ozone-Depleting Substances, for example, has been signed by 112 parties.

The principle of an HFC Amendment under the Montreal Protocol has also been endorsed in other intergovernmental forums, such as the G20[1] and the UN Conference on Sustainable Development in 2012 ('Rio+20').[2] In June 2015 the declaration of the G7 leaders included the statement that: 'We will continue our efforts to phase down hydrofluorocarbons (HFCs) and call on all Parties to the Montreal Protocol to negotiate an amendment this year to phase down HFCs and on donors to assist developing countries in its implementation.[3] In addition, joint statements supporting reductions in HFCs have been issued recently after bilateral talks between the United States and Brazil (June 2015),[4] Mexico (March 2015),[5] India (January 2015),[6] and China (November 2014).[7] Pope Francis, in

[1] G20 Leaders' Declaration, September 2013, #101 <wp-content/uploads/2014/12/Saint-Petersburg_Declaration_ENG_0.pdf>
[2] UN Conference on Sustainable Development 2012 (Rio+20) <sustainabledevelopment.un.org/index.php?page=view&type=2002&nr=129&menu=35>
[3] G7 Leaders' Declaration, June 2015 <https://www.whitehouse.gov/the-press-office/2015/06/08/g-7-leaders-declaration>
[4] US – Brazil statement, 30 June 2015 <https://www.whitehouse.gov/the-press-office/2015/06/30/us-brazil-joint-statement-climate-change>
[5] US- Mexico statement, March 2015 <https://www.whitehouse.gov/the-press-office/2015/03/27/joint-statement-us-mexico-climate-policy-cooperation
[6] US – India statement, January 2015, #45, <https://www.whitehouse.gov/the-press-office/2015/01/25/us-india-joint-statement-shared-effort-progress-all
[7] Us – China statement, November 2014, #7, <https://www.whitehouse.gov/the-press-office/2014/11/11/us-china-joint-announcement-climate-change

an Encyclical issued on 24 May 2015, recognised the gravity of climate change and its social, economic, political and environmental implications, and cited the Montreal Protocol as a positive example of a 'meaningful' and 'effective' global environmental agreement.[8]

Although there is general agreement that rising HFC use and emissions must be addressed, consensus has not yet been reached on the way forward. Concerns have been raised, among others, over the technical feasibility and cost implications of replacing HFCs, the availability of finance to support the transition by developing countries, and the legal relationships between the international ozone and climate regimes, given that emissions of HFCs (though not production or consumption) are controlled under the Kyoto Protocol to the UN Framework Convention on Climate Change.

Broader political dynamics have also come into play, in effect delaying any substantive negotiations on the proposed Montreal Protocol amendments. Several member states of the Gulf Cooperation Council (GCC), a number of other Arab states and Pakistan are among the small number of countries that have opposed formal discussion of an HFC amendment and the formation of a contact group to negotiate its details, citing concerns in particular about the availability of cost-effective and technically feasible alternatives for high ambient temperature climates.

Despite this slow pace of progress, an increasing number of national governments have adopted domestic commitments and regulations to limit and reduce the use of HFCs within their territories, sometimes as part of broader policies aimed at tackling climate change. This paper reviews the regulations and incentives in place as of September 2015.

Regulations can be categorised under six broad headings:

1. Limits on the total volume of HFCs which may be used; these may be progressively reduced over time to result in phase-down schedules similar to those applying to ODS under the Montreal Protocol.
2. Bans, or prohibitions, on using HFCs in particular applications or sectors, often specified as the maximum allowed global warming potential (GWP) in specific uses.
3. Fiscal incentives: either raising the price of HFCs through taxes, levies, charges or the inclusion of HFCs in emissions trading schemes; or reducing the price of HFC alternatives, through subsidies or other financial incentives.
4. Mandatory licensing of production, imports and/or exports of HFCs. Application fees may be required for licenses (generally as flat-rate fees, not proportional to the volume of products).
5. Requirements on industry, covering, for example, disposal, recovery and management at end of life for HFCs contained in refrigeration, air-conditioning, fire protection and foam products, emission controls, training and certification of service engineers, and use and emissions reporting requirements.
6. Specific regulations dealing with the destruction of HFC-23, a by-product of the production of HCFC-22: these may include requirements on industry and exclusion from emissions trading schemes.

[8] Papal Encyclical #24 – 26, <w2.vatican.va/cont/francesco/en/encyclicals/documents/papa-francesco_20150524_enciclica-laudato-si.html>

This paper focuses on the first four categories, as the policy measures likely to have most impact on reducing production and consumption of HFCs. It does not review the fifth and sixth categories, including the application of leak and emission controls and requirements for end-of-life recovery. Although such regulations are widespread, they have proved difficult to enforce and have not, so far, generally been quantified as successful.[9]

The main sources of information are the series of documents published by the Ozone Secretariat entitled 'Submissions by parties on the implementation of decision XIX/6'. For a full list of sources, see the Annex. Additional sources of information are identified in footnotes.

[9] For information on these national regulations, see *HFC Policy Analysis Report* (ICF International, for US EPA, January 2014), included in 'Submission by parties on the implementation of decision XIX/6' (UNEP/OzL.Pro.WG.1/34/INF/4/Add.1, 30 June 2014).

2 The EU and its member states

The European Union first legislated to control emissions of HFCs in 2006, adopting a regulation on emissions and a directive on mobile air-conditioning (see further below). Regulation 842/2006 on certain fluorinated greenhouse gases aimed only at containment, through measures such as control of leaks, proper servicing of equipment and recovery of the gases at the end of the equipment's life. In May 2014 this was replaced by the much more ambitious Regulation 517/2014 on fluorinated GHGs (the F-Gas Regulation), which entered into force on 1 January 2015.[10]

Until July 2015 (when the US announced its final rule removing high-GWP HFCs from use in specific applications on a specific time schedule) this was the only regulation in force anywhere in the world applying a phase-down schedule for total consumption of HFCs. It is aimed at achieving a reduction in sales of HFCs on the EU market by 79 per cent (GWP-weighted) from 2009–12 levels by 2030, with interim reduction steps starting in 2015 and applying roughly every three years (see Table 1).

Table 1. 2014 EU F-Gas Regulation HFC phase-down schedule

Date	**Cap on volumes of HFCs placed on the market by producers and importers as % of baseline**
2015	100
2016–17	93
2018–20	63
2021–23	45
2024–26	31
2027–29	24
2030	21

In addition, HFCs are banned outright in some categories of new equipment where alternatives are readily available (see Table 2).

Table 2. EU F-Gas Regulation bans on HFCs in new equipment applications

Application	**Containing or using HFCs of GWP**	**Banned from (1 January of)**
Domestic refrigerators and freezers	≥150	2015
Refrigerators and freezers for commercial use	≥2500	2020
	≥150	2022
Stationary refrigeration equipment	≥2500	2020
Centralised refrigeration systems for commercial use with capacity ≥40kW	≥150	2022
Movable room air-conditioning appliances	≥150	2020
Single split air-conditioning systems containing <3 kg of F-gases	≥750	2025
Foams	≥150	Extruded polystyrene: 2020

[10] Regulation (EU) No 517/2014 of the European Parliament and of the Council of 16 April 2014 on fluorinated greenhouse gases and repealing Regulation (EC) No 842/2006.

		Other foams: 2023
Technical aerosols	≥150	2018

The regulation also sets out requirements on the control of leaks, proper servicing of equipment and recovery of the gases at the end of the equipment's life. In addition, the regulation requires importers and EU producers to provide evidence that any HFC-23 by-product from the production of HCFCs, and from the production of feedstocks used in the process, was either destroyed or recovered for subsequent use.

Alongside the F-Gas Regulation, Directive 2006/40, the Mobile Air-Conditioning (MAC) Directive first adopted in 2006, remains in force. This prohibits the use of F-gases with a GWP of more than 150 (including HFC-134a) in new types of cars and vans introduced from 2011 and in all new cars and vans produced from 2017. Enforcement of the 2011 deadline was delayed until January 2013 because of car manufacturers' claims that they were experiencing difficulties in sourcing the alternative refrigerant HFO-1234yf. This was due to the earthquake and tsunami in Japan that destroyed the only full-scale production facility operating at the time, together with delays in the permitting of another full-scale production facility then under construction.

Taken together, EU policies on fluorinated gases (including other F-gases such as sulphur hexafluoride (SF_6) and perfluorocarbons (PFCs) as well as HFCs) will save a projected 1.5 GT CO_2-eq by 2030, and more than 5 GT CO_2-eq in 2050, compared to a business-as-usual scenario.

Like all EU regulations, the F-Gas Regulation applies uniformly throughout the EU's member states. Member states are, however, entitled to maintain or introduce more stringent requirements as long as they are compatible with the Treaty on the Functioning of the European Union (the EU's 'constitution'). A number of member states have introduced or contemplated introducing additional measures, including in particular the use of taxation to encourage phase-down (with a few exceptions, tax policy is the responsibility of member states, not the EU collectively). These are noted below.

Austria

Before the new F-Gas Regulation, Austria already had in place regulations prohibiting the import and use of HFCs in specified circumstances. From 2003, HFCs were banned in non-medical aerosol products, solvents and fire protection systems. From 2008, the use of HFCs in new air conditioners and freezers, including domestic refrigerators, freezers, and mobile air conditioners, and also for the production of foams, was prohibited; though the ban on HFCs in mobile air conditioners was never enforced, since no alternatives were commercialised at that time.

Belgium

The Belgian region of Flanders applies an 'ecology premium', a financial compensation for companies investing in environmental measures in the region. Financial support is available when enterprises choose to replace HFCs with natural refrigerants, in existing and new installations. The subsidy is calculated as a percentage of the additional cost of choosing HFC-free technologies.

Denmark

Denmark was the first EU member state to legislate on HFCs, introducing a range of bans and taxes to inhibit the use of HFCs and encourage the development of alternatives.

The import, sale, and use of new products containing HFCs and the import, sale, and use of new and recycled HFCs have been prohibited since January 2006, though the ban does not apply to products destined for export. There are a number of exemptions, most notably for mobile systems, including mobile air-conditioning and refrigerated shipping containers, for small charges of HFCs, and for servicing. Companies can apply for further exemptions where alternatives do not exist, are unreasonably expensive, or are more damaging to the climate than HFCs.

Taxation of HFCs has been applied since 2001, following taxes on CFCs and halons introduced in 1989. The tax applies to both production and imports (though in fact Denmark does not produce HFCs), and there are no exemptions, though tax paid on HFCs that are exported, or contained in products that are exported, is refunded. The original tax rate of DKK100 (about €13) per tonne CO_2-eq was increased in January 2011 to DKK 150 (about €20) per tonne CO_2-eq. In practice this means that HFC-134a, the most commonly used HFC, is subject to a tax rate of DKK195 (about €26) per kilogram, on a typical market price of €5 to €8 per kilogram.

Some of the Danish tax revenue has been invested back into the refrigeration industry through the establishment of the Knowledge Centre for HFC-Free Refrigeration, which offers consultancy services (free up to a limit) for the implementation of alternative technology.

Despite initial fears that the Danish tax would place too great a burden on industry, the policy has clearly provided an incentive for the uptake and development of alternatives. The regulation has led to a decline in the consumption of HFCs, with a fall of about half in the import of bulk HFCs from 2001–02 (700 tonnes) to 2009 (360 tonnes), and companies once dependent on HFCs have succeeded in marketing next-generation technologies.

France

In 2012 the French government conducted a public consultation on the introduction of a tax on HFCs with a GWP greater than 150. Four different options were consulted on, with rates ranging from €2.50 to €60 per tonne CO_2-eq, depending on the GWP. The government estimated that such a tax could lead to reductions in HFCs of up to 50 per cent by 2020 and 80 per cent by 2030. In 2013 the Environmental Taxation Committee (an advisory body set up by the government) recommended the introduction of an HFC tax.[11] The review and revision of the EU F-Gas Regulation, however, led the government to conclude that the tax was not needed, and it has not been introduced.[12]

[11] See Marc Chasserot (Shecco), 'Leading Retailers in EU & North America & HFC Tax update', presentation in Tokyo, 27 November 2013.

[12] Pers. comm., August 2015.

Poland

The established system of emission fees for 'using the environment' applies to emissions of HFCs (as well as CFCs and HCFCs). The government collects these emissions fees from companies releasing or emitting HFCs, CFCs and HCFCs; the revenue is directed to the Polish State Fund for Environmental Protection and Water Management to be used for managing F-gases, both through the maintenance of reporting databases and other F-gas emission reduction projects. The fee for HFCs is currently (2015) 30.19 zloty (about €7) per kilogram.

In addition, in 2014 the government announced proposals for a Placing on the Market (POM) fee for HFCs (and other F-gases), including products containing HFCs, with exemptions for HFCs used in metered-dose inhalers. The fee was to be set at 0.003 zloty (about €0.0007) per GWP-kg; the revenue was to be used as described above. In the end, however, the proposal was not implemented.[13]

Slovenia

Slovenia introduced an environmental tax on the use of HFCs (and other F-gases) in 2009. The tax is based on the climate impact of the substance; the price per tonne CO_2-eq is set each year. Introduced at a level at about €1 per tonne CO_2-eq, it was gradually increased to a level of about €14/tonne CO_2-eq in 2013, but then reduced sharply in the light of complaints from industry about the cost impact.[14]

The 2015 tax rate is €0.003456 per kilogram, multiplied by the GWP of the substance; so HFC-134a, for example, is subject to a tax rate of €4.49280/kg. This rate applies to the use of HFCs in servicing and maintenance; the rate for the filling of new equipment at production or stationary equipment at its first installation is 5 per cent of this (i.e. for HFC-134a, €0.22464/kg).[15]

Spain

A tax on F-gases, including HFCs, was agreed in 2013 and applied from January 2014.[16] The tax is levied on the consumption of F-gases with GWPs above 150. Tax levels are calculated by multiplying the GWP of the substance by 0.020, up to a maximum of €100 per kilogram. This corresponds to a tax level of €20 per tonne of CO_2, which is comparable to the F-gas tax in Denmark. Phased in over three years, the initial tax levy is set at one-third in 2014, two-thirds in 2015, and the full tax in 2016 and beyond.

[13] Pers. comm., August 2015.

[14] Dr Winfried Schwarz, et al, *Preparatory study for a review of Regulation (EC) No 842/2006 on certain fluorinated greenhouse gases: Final Report* (produced for European Commission, September 2011); Alexandra Maratou and Klára Skačanová (Shecco), 'GUIDE+: HFC taxes & fiscal incentives for natural refrigerants in Europe', presentation at ATMO Europe conference, 15–16 October 2013.

[15] Pers. comm., September 2015.

[16] 'Spanish HFC Tax Becomes Reality', 3M Novec News, 22 July 2014.

Fire suppression agents with a GWP of less than 3,500 are exempt from 90 per cent of the tax, in recognition of the current lack of sustainable alternatives.

Sweden

Before the introduction of the F-Gas Regulation, the Swedish government placed limits on permitted HFC refrigerant charges: maximums of 200 kg for supermarket refrigeration systems, 20 kg for medium-temperature applications and 30 kg for low-temperature applications.

In 2009 the Swedish Ministry of Finance published a proposal for an HFC tax, which was expected to reduce HFC emissions by approximately 100,000 tonnes CO_2-eq by 2020. The tax proposal, however, was not adopted.[17]

[17] Pers. comm., August 2015.

3 Developed countries not in the EU

Australia

The Ozone Protection Act of 1989 was amended in 2003 (and is now the Ozone Protection and Synthetic Greenhouse Gas Management Act 1989) to cover HFCs and other synthetic GHGs used as replacements for ODS. The government issues licenses for the manufacture, import and export of all HFCs and the import of equipment containing HFCs. Application fees are payable for each license: AUD15,000 (about €10,800) for HFCs and AUD3,000 (about €2,150) for equipment containing HFCs (though small volumes can have a partial waiver).

In 2012 the Labor government introduced a carbon tax applicable to all greenhouse gases, including HFCs applied to all production and imports. Following the 2013 election, however, the new Liberal/National government abolished the tax from 2014.

Canada

The government is currently legislating to introduce a mandatory permitting system for the import, manufacture and export of HFCs. The proposed Ozone-Depleting Substances and Halocarbon Alternatives Regulations were published in March 2015.[18]

Following consultations with industry, the government is also considering introducing regulations to phase down HFC consumption (in manufacturing, imports and exports) and to introduce prohibitions on specific HFC-containing products, such as air-conditioning and refrigeration equipment, foam insulation products and aerosol products. This approach is similar to the one used to phase out ozone-depleting substances. Work on defining the proposed controls is ongoing; proposed measures may be published in 2016.

Japan

Along with many other countries, Japan originally legislated simply to control leakage of HFCs and to improve the rate of recovery. In 2013, however, the government decided to adopt a more ambitious approach, and the Act on the Rational Use and Proper Management of Fluorocarbons entered into force on 1 April 2015.

The new legislation requires manufacturers and importers to replace high-GWP products with low-GWP or non-fluorocarbon alternatives. Target GWP values and years have been set for each application – for example, substances used for room air-conditioning must not exceed a GWP of 750 by 2018; for commercial air-conditioning a target of 750 by 2020; and for mobile air-conditioning, a target of 150 by 2023.

[18] See http://www.ec.gc.ca/lcpe-cepa/eng/regulations/detailReg.cfm?intReg=224.

Manufacturers and Importers will also be required to draw up plans to conduct an HFC phase-down; guidelines are available from the government setting five-year targets against which their performance will be assessed.

Macedonia

HFCs and mixtures containing HFCs can be imported only with a permit issued by the Ministry of Environment and Physical Planning.

Montenegro

The Montenegrin Decree on ODS and Alternative Substances (F-gases) under the country's Law on Air Protection covers HFCs (and other F-gases) and requires companies to acquire a license for each import, export and retail sale of HFCs. A fee of €5 is charged for each application for import or export.

New Zealand

In 2008 New Zealand introduced an emissions trading scheme to help control its GHG emissions. The scheme was extended to synthetic GHGs from 2013. Any company importing HFCs (and other F-gases) in bulk is required to participate in the scheme and to purchase and surrender 'emission units' equal to the CO_2-eq amount of the HFCs imported. Exporters can be awarded emission units for exports of HFCs.

Under the scheme's transition phase (which does not have an end date), scheme participants other than those from the forestry sector have to surrender one New Zealand emission unit for every two tonnes of emissions or pay the government a fixed price of NZ$25 (about €17.7) per unit. In January 2014 the market price of one unit was about NZ$3.50 (€2.5), an increase from NZ$2 (€1.4) a year earlier.

Importers of HFCs included in equipment and motor vehicles face a simpler system, being required (from 2013) to pay a levy at the point of import or (for vehicles) at the point of registration for on-road use. The levy is linked to the price of carbon and is updated annually.

Norway

A GWP-weighted excise duty on the import and production of HFCs (and perfluorocarbons), including HFC-134a in mobile air-conditioning systems in imported cars, was introduced in 2003, and has steadily been increase since, its rate in 2015 is NOK354 (about €39) per tonne CO_2-eq – approximately equal to the CO_2 tax rate on mineral oil. HFCs destined for export or re-export, and

very small quantities, are exempt. In 2004, this tax was supplemented with a refund scheme, which provides an equivalent refund when HFCs are destroyed.[19]

The growth rate of HFC emissions in Norway slowed down after the introduction of the tax, but is still increasing. As in many other areas of environmental policy, Norway plans to adopt the corresponding EU regulations, in this case the F-Gas Regulation.

Serbia

From 2014, licenses have been required for the import, export and placing on the market of HFCs (and other F-gases), as well as the import and export of air-conditioning equipment using F-gases.[20]

Switzerland

The original Swiss legislation regulating HFCs was amended in 2012 (and given a new name: Regulation on Substances Stable in the Atmosphere). The new provisions include, from December 2013, bans on many HFC uses, including larger air-conditioning systems and commercial and industrial refrigeration. HFCs with very high GWPs and the use of HFCs in domestic appliances and in foams (except where no alternatives are available) were already banned under the previous regulation.

US

The Climate Action Plan announced by President Obama in June 2013 set out a number of measures to address HFCs; it has been estimated that eliminating certain HFCs could provide 23 per cent of the emissions reductions needed to achieve the US's 2020 GHG emissions reduction goal of 17 per cent below the 2005 level.[21]

This action plan included the use of the Environmental Protection Agency's (EPA) Significant New Alternatives Policy (SNAP) programme, established to evaluate and regulate ODS replacements; the programme publishes lists of acceptable and unacceptable substances. Three new rules have recently been adopted, partly in response to petitions form environmental non-governmental organisations (ENGOs) filed prior to adoption of the Climate Action Plan:[22]

- October 2014 – expanded the list of acceptable substitutes for refrigerants, foam-blowing agents and fire suppressants.

[19] Directorate of Customs and Excise, *Excise Duty on Hydrofluoro-Carbons (HFCs) and Perfluoro-Carbons (PFCs) 2015*(Circular no. 7/2015, 1 January 2015).

[20] 'Implementation of recommendations, new or revised legislation / policy measures related to ODS and F-gases as part of HPMP implementation in Serbia', presentation by Ljubica Bolovic (Sector for the Protection of Natural Resources Air Protection Unit), July 2012. Updated, pers. comm., August 2015.

[21] Nicholas Bianco, Franz Litz, Kristin Meek and Rebecca Gasper, *Can The US Get There From Here?: Using Existing Federal Laws and State Action to Reduce Greenhouse Gas Emissions* (World Resources Institute, 2013).

[22] The ENGOs petitioning the EPA under SNAP are: Natural Resources Defense Fund, Institute for Governance & Sustainable Development (IGSD), Environmental Investigation Agency (EIA).

- February 2015 – changed the listing status of some HFCs in various end uses in the aerosols, refrigeration and air-conditioning and foam-blowing sectors from acceptable to unacceptable, and restricting the use of HFCs as aerosol propellants where there are no environmentally acceptable substitutes available.
- July 2015 – removed a long list of high-GWP HFCs from the SNAP list of acceptable substances on schedules comparable or slightly later than the EU's F-Gas Regulation (recognising the later enactment and the time necessary for industry to respond).

The US also provides manufacturers of cars and light trucks the opportunity to earn credits toward their compliance with CO_2 emission standards and corporate average fuel economy standards by employing low-GWP substitutes in mobile air-conditioning systems.

In addition to these actions at federal level, in 2009 the US state of California introduced refrigerant regulations which were expected to reduce F-gas emissions by six million metric tonnes of CO2-equivalent by 2020. In 2014 the state legislated to require the California Air Resources Board (CARB) to develop a comprehensive strategy to reduce emissions of HFCs (and other short-lived climate pollutants) by 2016. CARB released its draft proposal in May 2015 calling for an 80 per cent reduction in the use of HFCs in new refrigeration and air-conditioning equipment by 2030, the complete elimination of the use of HFCs in insulating foams and aerosol propellant consumer products 'as soon as possible', and for a transition to low-GWP refrigerants in commercial refrigeration 'as soon as possible, and no later than 2025'.[23] From 2018, HFCs will also be regulated under a state-wide cap-and- trade system.

[23] California Air Resources Board, *Short-Lived Climate Pollutant Reduction Strategy: Concept Paper* (May 2015).

4 Developing countries

Belize

Companies are required to apply for a license to import or export any type of HFCs (or other refrigerant gases).

Burkina Faso

Any importers of HFCs are required to seek approval from the Ministry of Environment in advance. Imports may be taxed, though the taxes may be waived if there are multilateral or bilateral agreements in place with the country of export. For HFCs, the full taxation amount is between 27 and 30 per cent of the total value of the imported products.

Colombia

All importers must obtain a license and seek approval to import HFCs.

Egypt

Any importers of HFCs are required to seek approval from the Egyptian Environmental Affairs Agency before clearing through customs.

Paraguay

The government provides support for the retrofitting of refrigeration systems (specifically refrigerators) and air-conditioning systems (split, window and rooftop types) to hydrocarbons. The government also possesses the power to apply control measures to the import of HFCs, though it is not clear whether these control measures have been applied.

Seychelles

Seychelles is introducing a new policy on HFCs from 2015. It includes tax incentives to encourage the import of low-GWP alternatives: zero import duty and value-added tax (VAT) on substances that are both zero ODP and zero GWP, 100 per cent tax on products with very high GWPs. In addition, all new buildings, including hotels (the main users of HCFCs in Seychelles), are required to ensure that ozone-safe, low-GWP alternatives are used.

Turkey

Turkey is reportedly planning to adopt F-gas legislation in 2015 based on the EU F-Gas Regulation.[24]

[24] 'Turkey to strengthen legislation on ozone-depletion and fluorinated gases', UNEP OzonAction 18 February 2013.

5 Summary and conclusions

The table below summarises the regulations described above.

Country	Limits	Use bans	Fiscal incentives, including taxes	Licensing
EU and member states				
EU	*	*		
Austria		*		
Belgium[a]			*	
Denmark		*	*	
Poland			*	
Slovenia			*	
Spain			*	
Sweden	*			
Other developed countries				
Australia				*
Canada				*
Japan		*		
Macedonia				*
Montenegro				*
New Zealand			*	
Norway			*	
Serbia				*
Switzerland		*		
US		*	*	
Developing countries				
Belize				*
Burkina Faso			*	*
Colombia				*
Egypt				*
Paraguay			*	
Seychelles		*	*	

a: Flanders region only.

The combined effect of these regional and national regulatory measures that tax, prohibit, and restrict the use of HFCs is to encourage the rapid development and commercialisation of alternatives to HFCs. The regulations that reduce or close off consumer markets to HFCs and HFC-containing equipment is a matter of significance to major developing country exporters of this technology, such as China and several South-east Asian countries, even if they do not control their own HFC use.

These many initiatives will be strengthened and harmonised by internationally agreed controls under an HFC amendment to the Montreal Protocol. As the past experience of the Montreal Protocol (and other multilateral environmental agreements) has shown, a patchwork of different national measures does not give as strong a signal to the market as globally applicable legally binding reduction schedules, which have more effectively accelerated technological development and

innovation. Furthermore, international agreement should provide guaranteed finance and institutional support for developing countries. The continued steep rise in HFC use, despite the many domestic and regional steps already taken, suggests that an international agreement under the Montreal Protocol will greatly contribute to successful control of these substances, reduce their contribution to global warming, and help ensure a healthier and safer world for future generations.

Annex: Sources

Except where noted, all information is derived from the following documents.

Most meetings of the parties and open-ended working groups are presented with a document entitled 'Submission by parties on the implementation of decision XIX/6'. This collates information provided to the Ozone Secretariat on steps to phase out HCFCs and to avoid replacing them with HFCs. The countries listed below against the specific documents provide information relevant to controls on HFCs; other countries' reports on HCFCs are also included but are not noted here.

'Submission by parties on the implementation of decision XIX/6' (UNEP/OzL.Pro.WG.1/34/INF/4, 30 June 2014): information on Australia, Canada, Japan, Norway and US.

HFC Policy Analysis Report (ICF International, for US EPA, January 2014), included in 'Submission by parties on the implementation of decision XIX/6' (UNEP/OzL.Pro.WG.1/34/INF/4/Add.1, 30 June 2014): broad overview of regulations as at mid 2013 (note this predates the adoption of the EU F-Gas Regulation), organised thematically.

Compendium of Policies Governing HFCs (ICF International, for US EPA, January 2014), included in 'Submission by parties on the implementation of decision XIX/6' (UNEP/OzL.Pro.WG.1/34/INF/4/Add.2, 30 June 2014): broad overview of regulations as at mid 2013 (note this predates the adoption of the EU F-Gas Regulation), organised by country.

'Workshop on hydrofluorocarbon management issues' (UNEP/OzL.Pro/Workshop.7/3, 5 August 2014): summarises the presentations and discussions at the HFC management workshop held in Paris in July 2014; includes specific information on EU, Japan, Mauritius, Seychelles, Switzerland and US.

'Submission by parties on the implementation of decision XIX/6' (UNEP/OzL.Pro.26/INF/4, 30 September 2014): information on the EU and seven member states (Belgium (Flemish region), Denmark (very detailed), Ireland, Netherlands (very detailed), Poland, Slovenia and Spain), Japan, Switzerland, US.

'Submission by parties on the implementation of decision XIX/6' (UNEP/OzL.Pro.WG.1/35/INF/2, 20 March 2015): information on Mexico and Paraguay.

Durwood Zaelke, Nathan Borgford-Parnell and Stephen O. Andersen, *Primer on HFCs* (IGSD, August 2015): broad overview, strong science, and detailed analysis.

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