European Semiconductor Industry Association

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Continued access to HFC compounds is essential for European Semiconductor Manufacturing

Semiconductor Industry (microchip industry): A proactive European leader in reducing fluorinated greenhouse gas emissions

The European Commission's fluorinated gas (F-gas) regulation proposal to phase down the supply of bulk Hydrofluorocarbons (HFCs) onto the European Union market targeting the major consumption of HFCs through refrigeration and air conditioning industries will have the serious unintended consequence of blocking access to HFCs for the semiconductor industry to produce semiconductor devices (microchips). The European semiconductor (SC) industry requests an exclusion for manufacturing SC devices from the HFC phasedown (below). This request is based on the following factual elements and the strong proactive fluorinated greenhouse gas reduction actions of the industry over many years.

1. The European semiconductor industry has met and surpassed its voluntary goal by reducing emissions of fluorinated greenhouse gases from the manufacturing process - (including HFCs) by 41% from the 1995 baseline to 2010.[i] Fluorinated greenhouse gas emissions are being well managed by the sector for many years.

2. HFC emissions from European semiconductor production accounted for 0.05% of the total HFC EU 27 emissions in 2010.[ii]

3. HFC compounds are used in the semiconductor manufacturing process. There are no proven substitutes for the use of HFC compounds in semiconductor production.

4. About 75% of the total HFC gas used in the semiconductor manufacturing process is destroyed by the industrial measures and not emitted to the environment.

5. No impact assessment on the proposed HFC phase down's impact upon the semiconductor industry was performed, due to the industry's status as a very minor user of HFCs.

The semiconductor industry would propose the following amendment to be included in the legislative text of the F gas regulation: *Article 13 (5) new*
Existing producers or importers who already place hydrofluorocarbons on the market in the Union for the purpose of supplying manufacturers that use HFCs as a process gas in

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the production of semiconductors shall be excluded from the phase down in article 13 (1) so long as the HFCs are placed solely on the market for use in the production of semiconductors and that use is verified with documentation.

Justification
HFCs are used in the manufacturing process by the semiconductor industry. There are no substitutes. The industry has successfully reduced its emissions of fluorinated greenhouse gases in Europe through a voluntary approach and continues to manage its emissions.

Additional Background Details

Semiconductor devices enable the reduction of greenhouse gases across society
The biggest benefit for the environment and European society comes from semiconductor devices (microchips) themselves. Semiconductor devices provide solutions that help people and the planet reduce energy and power consumption by increasing energy efficiency and reducing greenhouse gas emissions and improved functionality in many end user products. Regulators should consider the clear socio-economic benefits and enabling capabilities that semiconductor devices provide for the sustainability of Europe and the attainment of Europe's climate, energy efficiency and Horizon 2020 policy goals. F-Gases are key to the manufacture of semiconductor devices. There are no proven alternatives and without access to these gases, the industry cannot produce. As acknowledged by the European Commission (EU 'KETS' - COM 2009 - 512), the semiconductor industry provides the key enabling technologies to enable a more energy efficient and sustainable European society. Energy-smart semiconductors are ensuring the more efficient use of energy in the home, in LCD TV's, in industrial manufacturing systems, in public transport, in lighting, in personal computing and in data storage centres. Semiconductor technology also enables positive developments in, automotive fuel efficiency, automotive safety, reduced automotive emissions and improved innovations in medical devices and the realization of integrated smart grid energy systems across Europe.

Global Competitive disadvantage
The industry welcomes the statement for the commission in their report on the F gases regulation (COM(2012) 581 final) 'that only 'additional cost-effective reductions of F-gases in the EU' will be looked at. However the phase down of bulk HFCs and the direct impact on the semiconductor industry is in direct contradiction to this. There is a danger now that the supply of essential process gas is under risk to the European semiconductor industry due to the phase down whereas semiconductor manufacturing facilities in other regions of the world don't face this threat. This is a serious competitive disadvantage for European based semiconductor manufacturers.

Semiconductor Industry Voluntary Agreement
The European semiconductor industry has met and surpassed its voluntary reduction goal by reducing emissions of fluorinated greenhouse gases from the manufacturing process (including HFCs) by 41% from the 1995 baseline to 2010. If no progressive action and significant financial investments for emission technology reduction equipment and efficient processes had been undertaken by the European industry to reduce these emissions, they would have increased significantly above 1995 levels under a business as usual scenario. Post 2010, the industry has continued to manage its emissions and has renewed a voluntary agreement at a global level with all major regions of semiconductor production.

A Phase Down directly impacts the supply of HFCs to a user industry, not their emissions

From an environmental view the imposition of a quota system on the "use" of HFC's does not take account of the fact that the significant majority of the HFC's used by the semiconductor industry are not emitted. The substantial proactive achievements of the semiconductor industry to manage and reduce its fluorinated greenhouse gas emissions (including HFC's) have not been recognized by this legislative proposal.

Further marginal abatement not cost effective

Fluorinated greenhouse gas emission reduction methods and technologies are implemented across European semiconductor factories to destroy emissions. This is a proactive measure which the industry has voluntarily taken. The cost of further abatement for the semiconductor industry is substantially above 50 euro per tonne marginal abatement cost that is outlined in the EU carbon footprint roadmap and impact assessment of the Commission for the regulation. So this measure fails the European Commission's own cost efficient criteria analysis for the semiconductor industry.

About ESIA: The European Semiconductor Industry Association (ESIA) is the voice of the Semiconductor Industry of Europe. Its mission is to represent, promote and defend the common interests of the Europe based semiconductor industry towards the European Institutions and stakeholders in order to ensure a sustainable business environment and foster its global competitiveness. As a provider of key enabling technologies the industry creates innovative solutions for industrial development, contributing to economic growth and responding to major societal challenges. Being ranked as the most R&D intensive sector by the European Commission, the European Semi-conductor ecosystem supports approx. 200.000 jobs directly and up to 1.000.000 induced jobs in systems, applications and services in Europe. Overall, micro- and nano-electronics enable the generation of at least 10% of GDP in Europe and the world.

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[i] **ESIA PFC Voluntary Agreement final report https://www.eeca.eu/esh_pfc/**

[ii] **Page 82 , Section 3. HFC DEMAND AND EMISSIONS IN EU-27, COMMISSION IMPACT ASSESSMENT Review of Regulation (EC) No 842/2006 on certain fluorinated greenhouse gases, SWD 2012 – 364 Final**