OCCASION

This publication has been made available to the public on the occasion of the 50th anniversary of the United Nations Industrial Development Organisation.

DISCLAIMER

FAIR USE POLICY

CONTACT

Please contact publications@unido.org for further information concerning UNIDO publications.

For more information about UNIDO, please visit us at www.unido.org

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
Vienna International Centre, P.O. Box 300, 1400 Vienna, Austria
Tel: (+43-1) 26026-0 · www.unido.org · unido@unido.org

BOSNIA AND HERZEGOVINA
Ministry of Foreign Trade and Economic Relations

HCFC PHASE-OUT MANAGEMENT PLAN IN BOSNIA AND HERZEGOVINA

Sarajevo, August 2011

Country name: BOSNIA AND HERZEGOVINA

Project title:	HCFC Phase out Management Plan (HPMP) for Bosnia and Herzegovina
Project No:	MP/BiH/08/001
National Coordinating Agency	National Ozone Unit-Ministry of Foreign Trade and Economic Relations
International Implementation Agency:	United Nations Industrial Development Organization (UNIDO)
Contractor for preparation of HPMP :	Centre for Economical, Technological and Environmental Development (CETEOR), Sarajevo
HPMP preparation period:	August 2010 – July 2011

CONTENT

1. GENERAL INFORMATION

1.1 Country Profile

1.1.1 Geography

Bosnia and Herzegovina (in local language named as Bosna i Hercegovina - BiH) has a land area of 51,209 km^2 and is situated on the Balkan Peninsula in South-eastern Europe and belongs to the "Western Balkan" countries, as shown in the map of Figure 1.1. The country is bounded to the north, west, and southwest by Croatia, to the east by Serbia and southeast by Montenegro.
The country also has a short coastline (21.2 km) along the Adriatic Sea around the town of Neum and Peninsula Klek and shares a sea border with Croatia.

Figure 1.1: Map of Bosnia and Herzegovina

Bosnia and Herzegovina is a mountainous country with 62% of the land more than 700 m above sea level, as shown in Figure 1.2. The Dinaric Alps cross the country from its western border with Croatia to the southeast border with Montenegro. The central and western parts of the country are heavily forested, while the north (Posavina) and far south-west (Herzegovina) have flatter areas and valleys of fertile soil used primarily as farmland. The highest peak of Bosnia and Herzegovina is Maglic (on the souteast) at 2386 meters above the sea level.

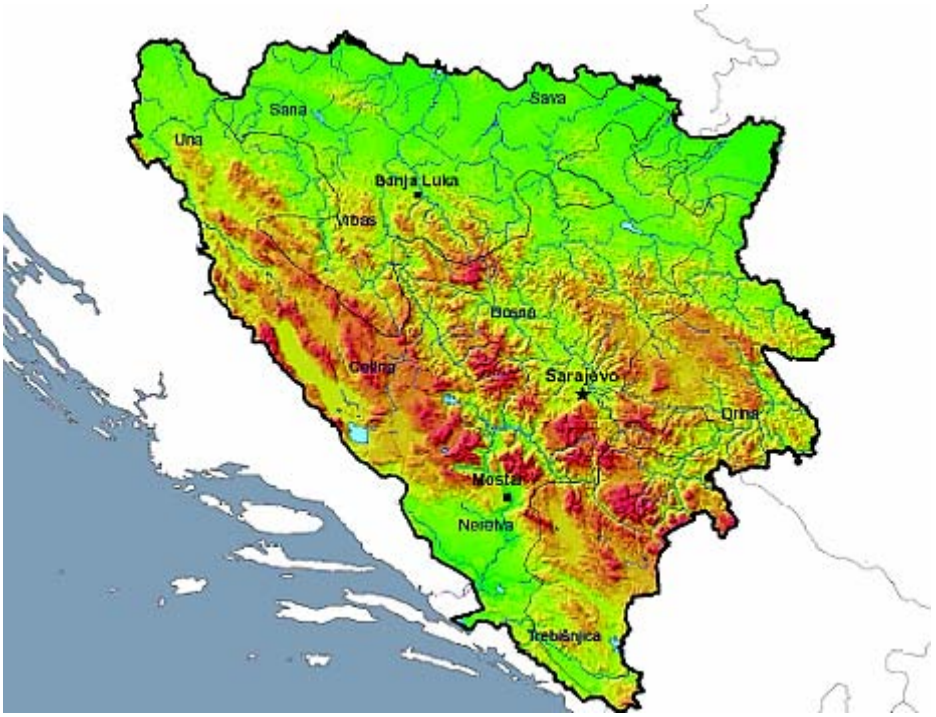


Figure 1.2: Geophysical map of Bosnia and Herzegovina

1.1.2 Climate and Natural Resources

The country is situated between the continental and Mediterranean climatic zones, which creates three local climatic areas. The northern inland territory has a moderate continental climate with warm summers and cold, snowy winters. The mountain areas above 700 m have a mountain climate with short, cool summers and long, severe winters with snow. The south has an Adriatic-Mediterranean climate with sunny, warm summers and short, mild, rainy winters. The average temperature in the capital of Sarajevo, in the continental zone, is -1 ºC in January and 20 ºC in July.

Bosnia and Herzegovina has significant water resources, many natural and mineral water springs and hydropower potential capacities which should be a key factor in the economic development of most areas in the near future. The longest river is Sava (331 km), which runs in flat area along the northern border. Sava and its tributaries, Bosna river (by which is named the country and State Bosna / Bosnia) passing by Sarajevo, Una at West, Drina at East and Vrbas at Northwest all flow to the north. Few rivers, notably Neretva (218 km) and Trebisnica flow towards the Adriatic Sea. Rivers also define the country's two historical provinces; Bosnia (one of the oldest European states – Middle-age Kingdom of Bosnae) lies between the rivers Una (on West), Sava (on North and Drina (on East) and Herzegovina is crossed by the Neretva river.

Forest and woodland cover 39% of the country, meadows and pastures 20%. About 14% of the land is arable, with 5% under permanent crops. Before the war Bosnia and Herzegovina produced and exported some of agricultural products, such as fruits and tobacco, but now it has to import more than half of its food, including essential staples.

The main natural resources of Bosnia and Herzegovina are its natural forests and biodiversity, coal and renewable energy sources, such as: hydro, wind, biomass, thermal and solar energy power potentials.

The country's natural resources include significant deposits of several minerals such as salt, manganese, silver, lead, iron and zinc ore, bauxite, chromium and coal.

1.1.3 Population

In the latest national census (1991), Bosnia and Herzegovina had 4.377 mill inhabitants and the population density was 85.5 inhabitants/km^2. Current population figures vary depending on the source but are estimated to be around 3.84 million (the last estimation from 2006 done by the Agency for Statistics of Bosnia and Herzegovina in the Country are leaving 3,842,762 inhabitants or 75.04 inhabitants/km^2).
The population of Bosnia and Herzegovina is relatively young with median age of 36.2 years.

The largest cities include the capital Sarajevo, which is also an important cultural and commercial centre (estimated population 400,000), then the other cities, with the estimated population: Banja Luka (250,000), Tuzla (180,000), Bijeljina (150,000), Mostar (140,000) and Zenica (135,000). Between 1991 and 2002 the population movement from the countryside to the towns increased the urban population from 40 to 60%. Bosnia and Herzegovina has three major population ethnic groups: Bosniaks, Serbs and Croats.
In 2006 the country's human development index, measured by the United Nations Development Programme (UNDP), was 0.800 (on the scale of 0.0 to 1.0). Bosnia and Herzegovina was 62nd out of 177 countries reviewed, which puts it in the group of countries with medium human development.

1.2 Economy

Before the last war in the Western Balkans (1992-1995), Bosnia and Herzegovina (BIH) had a diversified economic structure. Industrial production (43%), Agriculture and Forestry (18%) and Mining (14%) were important and produced the main part of the country's GDP. Tourism was also well developed. Yugoslavia's military industries were heavily concentrated there, and the defense industry, producing about 40% of Yugoslavia's armaments, was a significant part of the BiH economy.

The war caused industrial production to plunge, and in 1993 it was only about 20% of the 1989 pre-war level. Neither the end of the war nor international lending or aid has helped industry to regain its former production levels. Industrial output grew at high annual percentage rates from 1995 to 2000 and slowed down after that, but the original starting point was so low that production still remains lower than its 1989 level.

As a consequence of the war, inflation and industrial decline, unemployment soared to an estimated 70-80% in 1995. The economic recovery began after the 1995 Dayton Peace Agreement. The end of the hostilities and the very low level of economic activity during the war caused GDP to grow 54.2% in 1996. The fast growth continued until 1999 but slowed in the period 2000-2002. GDP is continuing fast growth with real growth rate of GDP per capita at around 7%, for two consecutive years 2007 and 2008, exceeded the amount over 3,000 EUR (3,648 in 2008). BiH has not directly suffered repercussions from the financial crisis and it is expected that in next few years it will be continued relatively high GDP growth rate. The recent evolution of the country's GDP is presented in Figure 1.3.

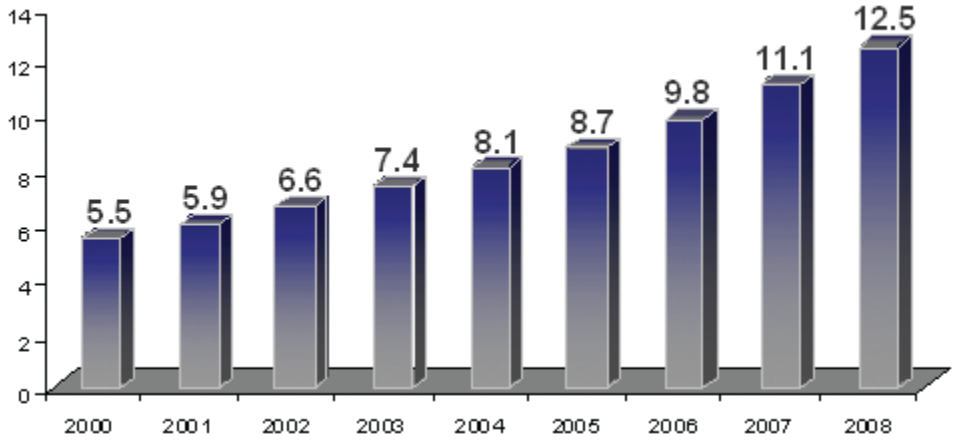


Figure 1.3: GDP evolution in recent years, billion €
(Source: Agency for Statistics of BiH, FIPA BiH, 2009)

The annual growth rate of industrial production in the decade from 1999 to 2008 was in an average of 9%.
Unemployment, as one of the most serious problems of domestic economy, indicates a modest trend of decrease. Registered unemployment in 2004 and 2005 was estimated at around 43%; though with the grey economy included might be in the order of 25-30%. The Labour Force Survey, which is regularly conducted from 2006 according to the international methodology, provides a real picture of labour market in BiH with unemployment rate at 23.4% in 2008

1.3 National Legislative Framework and Institutional Structure

1.3.1 Constitutional Framework and Governmental Structure

According to the Constitution of Bosnia and Herzegovina (BiH) - Annex IV of the General Peace Agreement for Bosnia and Herzegovina (concluded in November 1995 in Dayton, USA, and formally signed in Paris, France on 14 December 1995), BIH is a composite state consisting of two Entities: the Federation of Bosnia and Herzegovina (FBiH) and the Republika Srpska (RS) and the District Brčko of Bosnia and Herzegovina, which is under administrative management of the BiH Government. The Constitution stipulates free movement of persons, goods, capital and services in the entire territory of BiH. The Constitution also stipulates the division of competencies between the BiH state institutions and institutions of both Entities.
The Parliamentary Assembly has two chambers, the House of Representatives and the House of Peoples. The Parliamentary Assembly adopts laws and decides on the budget of the State institutions. The Presidency of Bosnia and Herzegovina ratifies international treaties after approval of the Parliamentary Assembly. All legislation on State level requires the approval of both houses.

The FBiH has its own constitution, a bicameral parliament and a government headed by a Prime Minister, who is nominated by the Parliament. The significant centers of political power in the Federation are the ten cantons, which have their own parliaments and governments.

The RS has a unified governmental structure and a unicameral People's Assembly (parliament) and a government headed by a Prime Minister, who is nominated by the People's Assembly of Republika Srpska.

1.3.2 Constitutional Provisions and Legal System in relation to International Treaties

The former SFR Yugoslavia (which BiH was one of the six Federal Republics) ratified the Vienna Convention on the Law on Treaties. On the basis of accepted Notification on succession / accession, BiH, as the one of the states successors of former SFR Yugoslavia, has applied this Treaty since 1994.

The Constitution of BiH contains the commitment under which general principles of international law shall be an integral part of the law of BiH and its entities. International treaties that BiH has ratified and which have entered into force become a part of the BiH legal system and their provisions prevail over those of domestic legislation that may contradict them.

By the State Law on the "Procedure of Conclusion and Implementation of International Contracts" (Official Gazette of BiH No. 29/90 dated 39 November 2000), all aspects and procedures for conclusion, process of ratification and implementation of international agreements and contracts and other activities related to the international contracts that are concluding by BiH, are regulated.

1.4 Environmental Overview and Implementation of the Montreal Protocol

1.4.1 Institutional Structure and Legislative Framework in BiH in the Sector of Environment

According to the Constitution of Bosnia and Herzegovina (based on the international agreement from Dayton, known as the "Dayton Peace Agreement for Bosnia and Herzegovina", concluded in Dayton, USA in November 2005 and signed in Paris, France in May 2006), main jurisdictions and duties of national administration in the field of environmental protection and nature resources are on entity level, while forming of strategic policy and international relations, including conclusion and implementation of international multilateral and bilateral agreements and contracts, is in the competence of the national administration, while ratification/approval of international agreements is done by the Presidency of Bosnia and Herzegovina, after given approval of both Houses (House of Representatives and the House of Peoples) of the Parliamentary Assembly

Bosnia and Herzegovina does not have an established national Ministry for Environment, neither has an adopted Law on Environment Protection on national level, but according to current "Law on Ministries and other Bodies of Bosnia and Herzegovina" from 2003, creating environmental policy and coordination of international relations of lower authorities in this field, and for coordination of implementation of international environmental multilateral agreements, the Ministry of Foreign Trade and Economic Relations is competent.

For implementing of environmental policy and operational implementation of ratified/accepted international agreements of Bosnia and Herzegovina in the field of environmental protection, entity ministries are competent (with current structure and names):

- Ministry of Environment and Tourism (Entity: FBiH)
- Ministry of Construction, Spatial Planning and Ecology (Entity: RS)

Both entity ministries have established operational subdivisions – sector for environmental protection

In District Brčko for those affairs the Department for Municipal Affairs of the District is competent.

Bosnia and Herzegovina has no special (specific) legislation in the field of environmental protection and natural resources on the national level. This issue is regulated by legislation of both entities (FBiH and RS) and the legislation of District Brčko.

Most important legislation of both entities and District Brčko in this field are:

- Law of the Republika Srpska on the Protection of Air**,** adopted by the Parliament of the Republika Srpska in 2002 (Off. Gazette RS No. 53/02);
- Law of the Federation Bosnia and Herzegovina on the Protection of Air adopted by the Parliament of the FBiH in 2003 and amended it in 2010 (Off. Gazette FBiH No. 33/03 and 4/10) and
- Law of the District Brcko of BiH on the Protection of Air**,** adopted in 2004 and amended in 2005 (Off. Gaz. of Brcko District No. 25/04 & 1/05)

These Laws also (generally) regulate main issues and policy tasks for the protection of the Ozone Layer, but did not regulate direct measures for the protection of the Ozone Layer in both Entities, or management of ODSs phase-out, but among the other issues announced the obligation of the Entity's Governments, particularly the Ministry of Physical Planning and Environment of the FBiH and the Government of the RS to regulate all operational issues for the protection of the Ozone Layer by issuing an additional Legal Act (By-law) for these issues.

1.4.2 Ratification of Multilateral Agreements for Ozone Layer protection

Bosnia and Herzegovina is classified as an Article 5 country of the Montreal Protocol and has ratified the following multilateral agreements on the protection of the Ozone Layer shown in the Table 1 bellow.

Table 1: Status of Ratification of the Multilateral Agreements for the Ozone Layer protection

Agreement / Amendment	*Entry into Force*	*Status of BiH Ratification**	*Date of BiH Ratification*	*Published in National Official Gazette*
Vienna Convention	November 1988	(Sc)	September 2003	Off. Gaz. SFRJ, MU No. 16/90; Off. Gaz. RBiH No 13/94)
Montreal Protocol	January 1989	(Sc)	September 2003	Off. Gaz. SFRJ, MU No. 16/90; Off. Gaz. RBiH No 13/94).
London Amendment	August 1992	(Ac)	August, 2003	Off. Gaz. BiH, MU, No 8/2003
Copenhagen Amendment	June 1994	(Ac)	August, 2003	Off. Gaz. BiH, MU, No 8/2003
Montreal Amendment	November 1995	(Ac)	August, 2003	Off. Gaz. BiH, MU, No 8/2003
Beijing Amendment	February 2002	??	Expected to October 2011	

Notes: **Statues of Ratification: (Sc) Succession; (Ac) Accession*

The Republic of Bosnia and Herzegovina which successor, from the adopted International Agreement for Bosnia and Herzegovina (known as the "Dayton Peace Agreement for Bosnia and Herzegovina", concluded in Dayton, USA in November 2005 and signed in Paris, France in May 2006) is the State of Bosnia and Herzegovina (BiH) has accepted the ratification of the Vienna Convention and the Montreal Protocol through the succession from the SFRJ in 1992 by accepting and taking over all international obligations of the former joint state – SFR Yugoslavia, concerning interests and rights of Bosnia and Herzegovina as an independent state in international affairs.

Bosnia and Herzegovina become the Party of the London, Copenhagen and Montreal Amendments by adopting its own ratification acts - Decrees of the Presidency of Bosnia and Herzegovina on the Ratification of the London, Copenhagen and Montreal Amendments to the Montreal Protocol (August 2003).

1.4.3 Background of Montreal Protocol implementation in Bosnia and Herzegovina

The former SFR Yugoslavia ratified the Vienna Convention and the Montreal Protocol in 1989 and as the developing country and country with annual low consumption of ODSs had been classified as the Article 5 country to Montreal Protocol. The war has prevented undertaking of concrete regulatory measures for monitoring, control, limitation and phasing-out of ODSs in this part of the former common country. With the succession of the former Yugoslavia, newly formed independent countries (former federal republics), and Bosnia and Herzegovina among them, according to the international legal relations, overtook the obligations of the former country in the implementation of the Montreal Protocol and its accompanying conventions. Unfortunately, BiH, ruined and destroyed by the war, in the post-war (post-Dayton) period of rehabilitation and reconstruction, had to deal with much more significant priorities than with those related to the environment and enforcement of the international obligations of the Montreal Protocol.

Due to the devastation of the pre-war economy, and especially due to the industrial sector and enormous decrease of the production, Bosnia and Herzegovina reached, in the first post-

Dayton year – 1996, only 8-10% of the pre-war production and operational capacity, and 5 years later – in 2000 only 20 – 30% of the pre-war industrial production. Therefore, the production of the ODS in the country is unnaturally reduced in relation to the pre-war period (1991) for about 70 – 80%.

The recovery of the industrial capacities, the return of the BiH industrial products, as well as those who use the controlled ODS in the production and service process, on old – traditional markets, cause slow but constant growth of the consumption (use) of these substances in the country. This growth is slowed down also by the slow privatization process of these state companies. Thus, occurred one unusual specific case when relation to Bosnia and Herzegovina is concerned, when compared with other Article 5 countries, when projection and planning of ODS phasing-out is concerned.

On one hand, BiH has one much reduced consumption of ODSs in relation to the installed industrial capacities and pre-war production, especially in production of refrigeration domestic and commercial appliances and equipment, as well as flexible and rigid foams, which indicates that the level of the necessary interventions and assistance is low. On the other hand, there were significant installed capacities, as well as the trend of significant production growth and the come-back of these manufacturers to the former markets, first of all to the local markets in BiH, in the neighboring countries of the former Yugoslavia (Croatia, Macedonia, Serbia) and the Balkan countries (Romania, Bulgaria, Albania). Thus, Bosnia and Herzegovina was in the very delicate and complex position that the country was in non compliance status with its obligations to the Montreal Protocol implementation, specifically to follow the phase-out program of CFCs, Methyl Bromide, Halons and TCAs (Methycloroform), which base lines for BiH were established based on the very low consumption in the country during the War and first after-war period (1995-2000).

1.4.4 Institutional Framework for Implementation of the Montreal Protocol

On the initiative of UNIDO, and with the support of the Multilateral Fund for the implementation of the Montreal Protocol, at the state Ministry of Foreign Trade and Economic Relations, at the beginning of 2000, the activities for establishment of Ozone Unit of Bosnia and Herzegovina were initiated through the Institutional Strengthening Project which was approved by the Multilateral Fund.

With the support of both BiH Entities, namely their relevant Ministries for environment (Ministry of Physical Planning and Environment of FBiH, and the Ministry for Physical Planning, Housing, Construction and Ecology of Republika Srpska), the Council of Ministers of BiH in July 2000 approved the project “Establishment of the Ozone Secretariat / Ozone Unit BiH” and concluding the Project document No. MP/BIH/99/053 with UNIDO and appointed the State Ministry of Foreign Trade and Economic Relations, as the National Agency for implementation of the project. In such a way an Ozone Unit of Bosnia and Herzegovina was established, with the premises and logistical support in the Ministry of Foreign Trade and Economic Relations and the two Branches of the National Ozone Unit, located in the two Entity Ministries: Ministry of Physical Planning and Environment and Environment of FBiH, and the Ministry for Physical Planning, Housing, Construction and Ecology of Republika Srpska. The Ministry of Foreign Trade and Economic Relations had appointed the Manager of the National Ozone Unit.

1.4.5 Country Programme for ODSs Phase-out and NOPP

The first proposal of the Country Programme for ODSs Phase-out in Bosnia and Herzegovina was prepared by the UNIDO technical assistance during 1997/1998 and was supported by the Entities' Authorities (Governments of FBiH and RS), and the Ministry of Foreign Affairs of Bosnia and Herzegovina before its approval done by the Executive Committee of the Multilateral Fund This Programme should have been the basis for obtaining the technical and financial assistance from the Multilateral Fund for the implementation of the Montreal Protocol for carrying out the obligations of Bosnia and Herzegovina (BiH), as a country (Party to the Montreal Protocol) categorized as the Article 5 country.
Under the support of the Multilateral Fund and technical assistance of UNIDO, in 2001, and under organization of the National Ozone Unit was updated and revised the Country Programme and developed the Action Plan for its implementation, which were approved by the Multilateral Fund.

The main goals of this Programme were:

- Establishing and institutional strengthening of the National Ozone Unit in BiH with its priority tasks to coordinate all operational activities in Bosnia and Herzegovina for the implementation of the Montreal Protocol and assist the ODS consumers and other relevant Entities' authorities, and eligible enterprises (ODS consumers) in formulating and preparing of conversion (investment) projects for ODS phasing-out;
- Preparation and coordination of the implementation of an Action Plan for ODSs, specifically CFCs, Methyl Bromide, Halons and TCAs phase-out and Projects Business Operational Plan;
- Initiation and participation in activities in BiH for establishment of legal and institutional framework for ODSs phase-out management as well as monitoring and control of import / export and consumption of ODS in BiH.

In 2003 the National Ozone Unit with the assistance of UNIDO prepared the "National ODS Phase-out Plan" (NOPP) for Bosnia and Herzegovina, which was approved by the Executive Committee of the MLF in December 2003.

Under the "National ODS Phase-Out Plan" and Decision XV/30 of the 15th Meeting of the Parties to the Montreal Protocol of November 25, 2003, the committed annual consumption of ODSs in Bosnia and Herzegovina and the plan for their phase out are shown in the Table 2 billow.

Table 2. Base-lines and BiH Plan - commitment for ODSs Phase-out

Montreal Protocol	***Controlled substances***	***Obligation of the countries classified according to the Article 5 of the***	***Obligation of Bosnia and Herzegovina according to the***

Annex / Group	*(ODSs)*	*Montreal Protocol (Article 5 countries)*	*National Plan and MOP Decision XV/30 from Nov. 2003 Annual consumption (M Ton)*
A I	**CFCs**	Base level: Average of 1995-1997 Freeze : July 1, 1999 50% reduction: January 1, 2005 85% reduction : January 1, 2007 100% reduction : January 1, 2010	**Base level: 24.160** 235.300 – for year 2003 167.000 – for 2004 102.100 – for 2005 63.000 – for 2006 33.000 – for 2007 3.000 – for 2008 **0 from 1st. Jan. 2009**
A II	**Halons**	Base level : Average of 1995-1997 Freeze : January 1, 2002 50% reduction : January 1, 2005 100% reduction : January 1, 2010	**Base level: 0.680** 0.680 – for year 2005 0.680 – for 2006 **0 from 1.st. Jan. 2007**
B III	**1,1,1,-tricloroethane** (methyl chloroform)	Base level : Average of 1998-2000 Freeze : January 1, 2003 30% reduction : January 1, 2005 70% reduction : January 1, 2010 100% reduction : January 1, 2015	**Base level: 17.000** 17.000 for year 2003 17.000 for 2004 11.000 for 2005 5.000 for 2006 **0 from 1st. Jan 2007**
E I	**Methyl Bromide**	Base level : Average of 1995-1998 Freeze : January 1, 2002 20% reduction: January 1, 2005 100% reduction : January 1, 2015	**Base level: 19.650** 19.650 for year 2004 8.900 for 2005 8.900 for 2005 **0 from 1st. Jan 2007**

In spite of all specific circumstances and unconvinced position of the country in the implementation of its obligations towards the Montreal Protocol and ongoing obstacles, Bosnia and Herzegovina successfully implemented the most of plans and activities undertaken from the Country Programme and NOPP in past years and reached the compliance status in the phasing-out of all 4 groups of ODSs: CFCs, Halons, 1,1,1, - trichloroethane and Methyl Bromide.

The Review of the implementation of the NOPP and the phase-out of consumption / import of these 4 groups of the control substances and the achieving the compliance status towards the Montreal Protocol implementation is shown on the Table 3 bellow.

Table 3. Implementation of Programmes and Projects for ODSs consumption phase-out in Bosnia and Herzegovina in the period 2003-2009

	Annual consumption (in Metric Tons-MT) by years

GROUP OF ODSs	*2003*	*2004*	*2005*	*2006*	*2007*	*2008*	*2009*	*2010*	*2015*
Annex A-II CFCs									
Max allowable total consumption of CFCs	24.16 *(baseline)*	24.16	12.08	12.08	3.6	3.6	3.6	0	
Expected total consumption	240	173	76	33	3	0	0	0	
Consumption reduction under the NPP	0	0	50	43	30	3	0	0	
Total annual reduction (under the Country Programme & NPP Plans)	0	77	87	43	30	3	0	0	
Compliance status with the Montreal Protocol (NOPP Plan 2003)	Non compliance period				Plan to achieve compliance				
Actual total consumption (Ref.: BiH Annual Reports to MLF)	230	230	51.2	31.7	22.2	8.8	0		
Compliance status with the Montreal Protocol	Non compliance period						**ACHIEVED COMPLIANCE**		
Annex A-II Halon(s)									
Max allowable total consumption	-	-	-	-	-	-	-	0	0
Expected total consumption (NOPP Plan)	0.68	0.68	0	0	0	0	0	0	0
Total annual reduction of Halons (under BiH Plan)	0	0	0.68	0	0	0	0	0	0
Compliance status with the Montreal Protocol (NOPP Plan 2003)	Non compliance period			Plan to achieve compliance					
Actual total consumption (Ref.: BiH Annual Reports to MLF)	0.68	0.68	0	0	0	0	0		
Compliance status with the Montreal Protocol	Non compliance period		**ACHIEVED COMPLIANCE**						
Annex B-III TCA (Solvents)									
Max allowable total consumption	17 (*baseline*)	17	11.9	11.9	11.9	11.9	11.9	5.1	0
Expected total consumption	22.6	16.6	0	0	0	0	0	0	0
Total annual reduction (under NOPP Plan)	0	6	16.6	0	0	0	0	0	0
Compliance status with the Montreal Protocol (NOPP Plan 2003)	Non compliance period			Plan to achieve compliance					
Actual total consumption (Ref.: BiH Annual Reports to MLF)	3	36	6.84	0	0	0	0		
Achieved compliance status with the Montreal Protocol	Non compliance period			**ACHIEVED COMPLIANCE**					
Annex E Methyl Bromide									
Max allowable total consumption	4.2 (*baseline*)	4.2	4.2	4.2	4.2	4.2	4.2	4.2	0
Expected total consumption	19.65	19.65	9.8	0	0	0	0	0	0
Total annual reduction (under NOPP Plan)	0	0	9.8	9.8	0	0	0	0	0
Compliance status with the Montreal Protocol (NOPP Plan 2003)	Non compliance period				Plan to achieve compliance				
Actual total consumption (Ref.: BiH Annual Reports to MLF)	16.4	16.4	1.29	0	0	0	0		
Achieved compliance status with the Montreal Protocol	Non compliance period			**ACHIEVED COMPLIANCE**					

1.5 Implemented Programmes and Projects for ODS Phase-out

Table 4. Status of the implementation of BiH projects approved by MLF trough the Country Programme and NOPP

Project No.	*Project Name (Name of International Implementation Agency)*	*Project amount ($)*	*Status of implementation*	*ODSs phased-out (ODP t)*
	(International Implementation Agency: UNIDO)			
MP/BIH/99/053	Establishment of an Ozone Secretariat / NOU	**104,709**	***Completed***	***n/a***
MP/BIH/00/035	Project preparation in the flexible foam sector	**14,763**	***Completed***	***n/a***
MP/BIH/01/071	Project preparation in the commercial / domestic refrigeration sector	**6,976**	***Completed***	***n/a***
MP/BIH/01/072	Project preparation in the commercial refrigeration sector	**13,388**	***Completed***	***n/a***
MP/BIH/01/163	Preparation of two investment projects in the flexible foam sector	**14,263**	***Completed***	*n/a*
MP/BIH/01/218	Replacement of refrigerant **CFC-12 with HFC-134a** and foam blowing agent **CFC-11 with cyclo-Pentane** in the **manufacture of domestic refrigeration equipment** at **BIRA**, Bihac	**536,161**	***Completed***	***33.4***
MP/BIH/01/219	Replacement of refrigerants **CFC-12 and R-502 with hfc-134a and r-404a, and foam blowing agent CFC-11 with HCFC-141b** in the **manufacture of commercial refrigeration equipment and cold refrigeration chambers at SOKO-RKT,** Mostar	**158,889**	***Completed***	***21.2***
MP/BIH/01/227	Conversion from **CFC-11 to methylene chloride** in the **production of flexible slab stock foam at INGA Co**, B. Gradiska.	**100,445**	***Completed***	***21.0***
MP/BIH/02/016	Preparation of a **National ODS phase-out Plan**	**78,078**	***Completed***	*n/a*
MP/BIH/02/049	Preparation of two investment projects in the commercial refrigeration sector	**11,537**	***Completed***	*n/a*
MP/BIH/02/063	Preparation of an investment project in the rigid foam sector	**14,584**	***Completed***	*n/a*
MP/BIH/03/029	Replacement of **CFC-12 with HFC-134a, CFC-11 with HCFC-141b**, and **TCA with non-cleaning process** in the **manufacture of commercial refrigeration equipment, panels**, **and heat exchangers at three enterprises** (**Soko Paneli**, Ljubinje; **Soko IPV**, Čitluk and **Kuca Leda**, Mostar)	**169,414**	***Completed***	***14.9***
MP/BIH/03/030	**Phase-out of CFC-11 by conversion to n-Petane** in the **manufacture of rigid foam products** at **Stirokart Co**, Srbac	**364,635**	***Completed***	***33.0***
MP/BIH/03/090	**Phase-out of Methyl Bromide in tobacco seedling vegetables and flower production sector**	**225,663**	***Completed***	***11.8***
MP/BIH/03/091	**National ODS phase-out Plan** (first tranche)	**263,302**	***Completed***	***28.5***
MP/BIH/04/019	**Phase-out of halon consumption**	**64.000**	*Ongoing*	***4.14***
MP/BIH/04/065	**Extension of Institutional Strengthening**: **Phase II**		*Ongoing*	*n/a*
MP/BIH/04/123	**National ODS Phase-out Plan** (second tranche)	**228,996**	***Completed***	***5.6***
MP/BIH/07/001	**National ODS Phase-out Plan** (third tranche)	**303,000**	*Ongoing*	
TOTAL CFCs PHASED-OUT				***173.5***
	(International Implementation Agency: UNEP)			
IML/5070-2761	**Assistance for regional awareness raising -2004**	**7,770**	*Completed*	*n/a*
IML/5070-2A43	**Assistance for regional awareness raising-2007**	**13,000**	*Completed*	*n/a*
IML/5070-2529	**UNEP Compliance Assistant Programme 2008**	**10,000**	*Completed*	*n/a*

On the Table 4 above is shown an overview of all by the MLF approved projects for Bosnia and Herzegovina and the current status (October 2010) of their implementation, including the ODS phased-out quantities (in ODP tonnes) for each particular approved and completed investment project, implemented trough the Country Programme and NOPP.

The following Programmes and Group of the particular investment and training projects were successfully implemented in the sectors:

Investment projects

- Industrial production of refrigeration appliances and foam (conversion of CFCs to HCFCs and HFCs) -7 sub-projects;
- Technical assistance for Solvent sector program (conversion of TCA use to non-TCA cleaning technology) – 1 project
- Halon Management Program (phase-out of Halons use in BiH);
- Methyl Bromide Phase-out Program in agriculture manufacturing sector

Training programmes

- Custom Empowerment Program (training of Custom and State Border Police officers on the implementation of the Montreal Protocol and Ozone Legislation in place in BiH)
- Training of refrigeration service technicians is in the final phase of preparation, expecting to start in October 2011

List of Multilateral Fund CFC projects that have been replaced with HCFCs

The following investment projects for CFCs conversion to HCFCs were implemented trough the Country ODS Phase-out Programme and through the National ODS Phase-out Plan (NOPP) during the period 2002-2006, :

Table 5: List of investment projects approved and funded by the Multilateral Fund implemented in BiH for conversion of CFC to HCFC technology

Project No.	*Project Name (Name of International Implementation Agency)*	*Year of comple-tion*	*Main equipment supplied trough the project (using HCFCs in current operation)*	*Current used HCFCs in enterprises' manufacture process*
	(International Implementation Agency: UNIDO)			
MP/BIH/01/219	Replacement of refrigerant **CFC-12 with HCFC-22 and HFC-134a,** and foam blowing agent **CFC-11 with HCFC-141b** in the manufacture of commercial refrigeration equipment and cold refrigeration chambers / stores at the enterprise **SOKO-RKT,** Mostar	***December 2004***		- HCFC-22 as refrigerant in production of commerc. refrig. appliances; - HCFC-141b as blowing agent for insulation foam
MP/BIH/03/029 (Umbrella project)	Replacement of refrigerant **CFC-12 with HFC-134a and HCFC-22,** and foam blowing agent **CFC-11 with HCFC-141b** in the **manufacture of commercial refrigeration equipment, insulation panels**, **and vehicles cold rooms at three enterprises:**	***December 2005***		
	∗ **KUCA LEDA**, Mostar		- Foaming spray machine & refrigerant charging machine	- HCFC-22 for charging of comm. refrig. appliances; - HCFC-141b for refrig. insul. foam & panels
	∗ IPV, Citluk		- No equipm. supplied	- No current HCFC technology applied
	∗ SOKO PANELI, Ljubinje		- Foaming machine	- No HCFCs used
MP/BIH/03/091	**National ODS Phase-out Plan – Investment Projects:** Replacement of refrigerant **CFC-12 with HFC-134a and HCFC-22,** and foam blowing agent **CFC-11 with HCFC-141b** in the **manufacture of commercial refrigeration equipment and cold rooms at 6 SMS enterprises, of which the following enterprises still use HCFCs technologies:**			
	∗ **ORDAGIC, Srebrenik**		- Foaming machine & set of refrigerant charging equipment	- HCFC-22 for charging of comm. refrig. appliances; - HCFC-141b for refrig. insul. foam & panels
	∗ **SOFREL, Sarajevo**		Foaming machine & set of refrigerant charging equipment	- HCFC-22 for charging of comm. refrig. appliances; - HCFC-141b for refrig. insul. foam
	∗ **EKO FRIGO, Banja Luka**		Refrigerant charging machine	- HCFC-22 for charging of comm. refrig. appliances; - HCFC-141b for refrig. insul. foam

1.6 ODS Legislation –Licensing and Monitoring System

1.6.1 ODS Legislation at State and Entities' levels

The crucial legislation adopted in Bosnia and Herzegovina for the implementation of the Montreal Protocol and establishment the National Programme for ODSs phase-out as well as establishment and put at place a Licensing and Monitoring System is:

At State level:

"DECREE on Conditions and Procedures for the Implementation of the Montreal Protocol and Phase-out of Substances that Deplete the Ozone Layer in Bosnia and Herzegovina" (Off. Gazette BiH No. 36/07).

This the first (ODS Legal Act) established at State level in BiH contents the following main regulations:

- Conditions for import and export of substances that deplete Ozone Layer (Licensing System, Import Quotas and Import Permits - procedures of issuance;
- Conditions for import and export of products and equipment, which contain or functionally use of ODSs;
- Plan and Programme of BiH for the implementation of the Montreal Protocol and phase-out of ODSs
- Monitoring and control system of ODSs and equipment containing or using ODSs import / export;
- List of controlled ODSs and the list of equipment containing ODSs with the Custom Codes, adjusted and harmonized with the Annexes A,B,C,D and E of the Montreal Protocol and the European Union Regulations;
- Reporting procedures and reporting standard formats for reporting to the relevant domestic and international authorities, organizations or bodies on the import / export and annual consumption of ODSs.

At Entities' level *(in both Entities: Federation of BiH and Republika Srpska):*

"Regulation / DECREE on Phase-out of Substances that Deplete the Ozone Layer (Off. Gazette F BiH No. 39/05 and Off. Gazette RS No. 94/05).

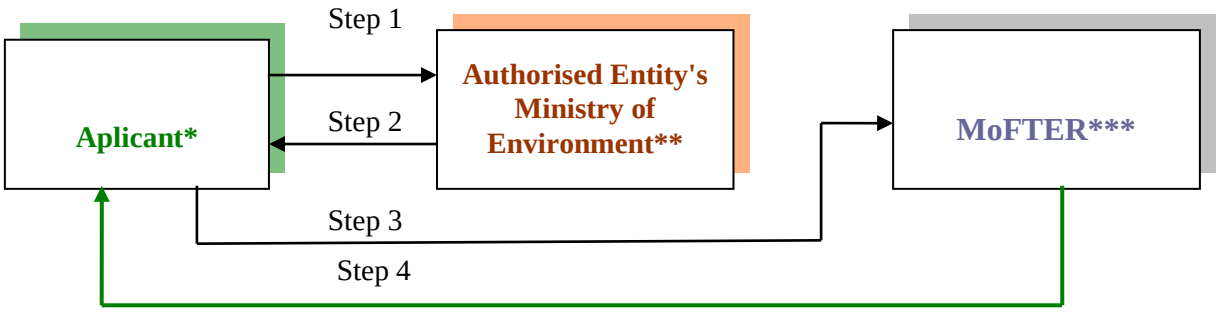
This Legislative Act among the others contains:

- Conditions and Procedures for Phase-out of ODSs and there substitution with alternatives;
- Procedure and responsibilities of owners of equipment which contain or use ODSs during its charging and discharging process and equipment deposing regulations;
- Procedures for Management of Equipment that contain or made of ODSs;
- Registration of ODSs import / export and consumption and data reporting procedures in accordance with International Agreements
- Terms and conditions for registration and operational activities of refrigeration services in Republika Srpska;
- Role and responsibility of the Ministry of Environment of FBiH and RS in issuing Licenses, Import Quotas and Permits.
- Responsibilities of ODSs importers regarding registration of imported substances and reporting to the Ministry;

1.6.2 Licensing and Monitoring System for ODSs import / export

The procedure for obtaining and issuing licenses, import quotas and import/export permits for ODSs import / export in Bosnia and Herzegovina is schematically shown and described on the schemas 6a, 6b & 6c billow

Scheme 6a: Procedure for obtaining an ODS Import License:



LEGEND:

* **Aplicant** - Any legal business entity regularly registered for the import/export of goods in Bosnia and Herzegovina

* **Authorised Entity's Ministry of Environment** is a related Ministry of Environment in that Entity (RS or in FBiH) where the Aplicant's business was registered:

- Ministry of Environmet and Tourism of the F B&H
- Ministry for Physical Planning, Civil Engineering and Ecology of the RS

*** **MoFTER**-Ministry of Foreign Trade and Economic Relations

Steps for obtaining of ODS Import Licence

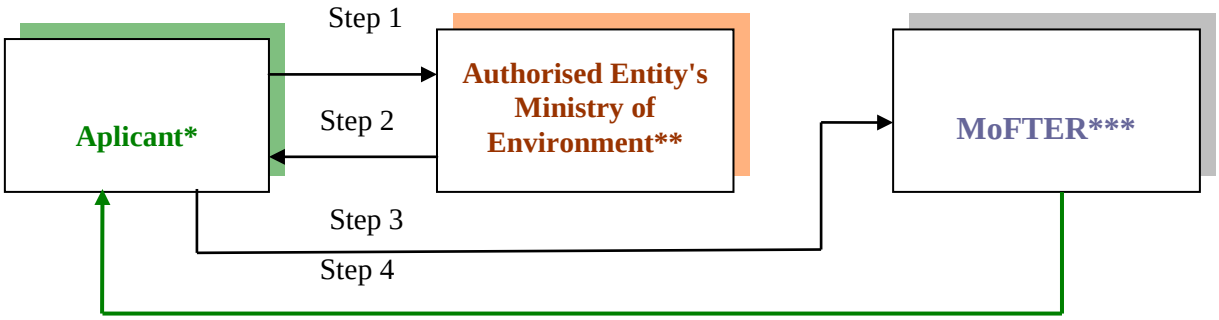
Step 1: Aplication for licence delivered for consideration/opinion to the Authorised Entity's Ministry (Entity's Ministry)

Step 2: The Ministry considers the Aplication and issues a written positive opinion to the Aplicant;

Step 3: The Aplicant delivers an Aplication, with enclosed written positive opinion from the Enity's Ministry to MoFTER

Step 4: The MoFTER issues the License (valid for one calender year duration) to the Aplicant

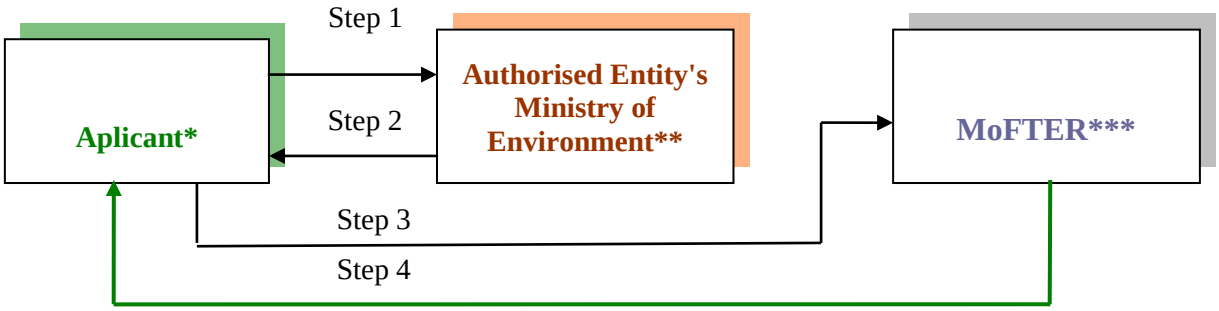
Scheme 6b: Procedure for obtaining an ODS Import Quota Permit:



Steps for obtaining of ODS Import / Export Quota Permit

Step 1: Aplication for the Annual Import Quota delivered for consideration/acceptance to the Authorised Entity's Ministry
Step 2: The Ministry considers the Aplication and issues a written acceptance for such requested annual import quota to the Aplicant;
Step 3: The Aplicant delivers an Aplication, with enclosed written acceptance from the Enity's Ministry to MoFTER
Step 4: The MoFTER, on the base of the NOU reccomendation issues an Annual Import Quota to the Aplicant (taking into consideration the totals of alowable import quantities for each of requested controlled substances.

Scheme 6c: Procedure for obtaining an ODS Import / Export Permit:



Steps for obtaining of ODS Import / Export Permit

Step 1: Aplication for each particular requested quantity of ODSs, based on the issued Annual Quota Permit delivered for consideration/acceptance to the Authorised Entity's Ministry
Step 2: The Ministry considers the Aplication and issues a written acceptance to the Aplicant for each requested ODS import contigent / lot;
Step 3: The Aplicant delivers an Aplication for Import Permit, with enclosed written acceptance from the Enity's Ministry to MoFTER
Step 4: The MoFTER, on the base of the NOU reccomendation and already issued Annual Quota Permit issues the Import Permit to the Aplicant (taking into consideration the total of approved Annual Quota for such Aplicant.

Each particular license and annual quota permit as well as import permit is issuing on the State level, by the MoFTER and should be signed by the Minister or his Deputy only.

The National Ozone Unit on behalf of the Ministry of Foreign Trade and Economic Relations and the National Custom Office are the Authorities that supervise and control imports and exports of ODSs in Bosnia and Herzegovina.

1.7 Lessons learned concerning HCFCs

Bosnia and Herzegovina established the ODS Phase-out Programme (Country Programme and NOPP) for phase-out of CFCs, Methyl Bromide, TCAs and Halons, by which successful implementation of the approved projects enabled the Country to phase-out consumption of CFCs, Methyl Bromide, Trichloroethane and Halons within the planned and agreed time.

Most of the investment projects implemented in the Industrial Refrigeration and Foam Production Sectors provided conversion of CFC-11 used as a foaming agent in production of flexible and rigid foam to:

- use of cyclo-Pentane in production of domestic refrigeration appliances at the production plant BIRA, Bihac;
- use of n-Pentane in production of rigid foam insulation sandwich panels at the STIROKART, Srbac production plant
- use of Methylencloride in the production process of flexible foam at the INGA/ORGANIKA production plant.

For all the other implemented projects, approved and co-funded by the Multilateral Fund in the Refrigeration Sector, conversion of CFC-11 blowing agent have been converted to use HCFC-141b in production of insulation foam in the production processes in the Commercial Refrigeration Sector (see the Table 4 above).

The national adopted Ozone Legislation (at state and Entities' levels) introduced and put in place the Licensing and Quota System as well as issuing of Import Permit for each of imported contingent of HCFCs, but without any limitation of approved imported quantities.
There is not proposed any oblige of Importers of equipment containing or using HCFCs to obtain import license, Quota permit or import permit to import or re-export of such goods.

There is not proposed or in the implementation any training or awareness raising management programme or project for HCFC conversion to any alternative substances.

2. DATA COLLECTION AND HCFC SURVEYS

2.1. Content of the Data Collection and Surveys done

This Research (surveying), that have been made by the national team for the preparation of HPMP Bosnia and Herzegovina, collected information and surveys done from the NOU Data Base and from the Project Site, shows collected data and information, relevant for HPMP preparation:

- Description of methodology for information collection „on the Desk data collection" and „on the Project Site data collection" and used source of information;
- Relevant statistical data for BiH
- CFCs consumption in BiH
- Installed capacities/quantities of HCFC at end users
- HCFC consumption in BiH, by years, in the period 2003 – 2009 and consumption forecast for the period 2010 – 2012;
- HCFC consumption in BiH, by years, for the period 2006 – 2009;
- List of authorized HCFC importers in BiH for the period 2003 – 2009 and main distributers of this substances;
- Price overview of imported HCFC substances in BiH in the period 2008 – 2009;
- HCFC consumption, by sectors: foam production and production of refrigeration, cooling and air-condition appliances (chillers and cold chambers / stores) in the service sector for refrigeration and air condition appliances;
- Installed quantities of HCFC in the air-condition systems / units in BiH
- Annual needs of HCFCs for servicing of refrigeration and air-condition appliances
- Consumption of HCFC refrigerants alternatives – blends in BiH in the period 2005-2009

2.2. Description of Surveying Methodology

The main sources of the data and information collected during the preparation of the HCFC Phase-out Management Plan (HPMP) document were:

For "On desk data collection":

- National Ozone Unit and the State Custom Office database and reports issued to the domestic and international authorities (Annual National Reports for Import / Consumption of CFCs for the period 1989-2009 and consumption of HCFCs during the period 2003-2009), and for the preparation of a list of registered Importers and Distributors of HCFCs to BiH Market);
- Agency for Statistics of Bosnia and Herzegovina and both Institutes for Statistics of the Entities Federation of BiH and Republika Srpska for all statistical data relevant for the preparation of HPMP.

Having into consideration that in Bosnia and Herzegovina **ODSs annual import is equal to ODSs annual consumption**, due to the fact that there was no production and not any registered exports of these control substances in the mentioned period, all presented data of CFCs and HCFCs imports are also the annual consumptions of these substances;

For "On Project Site data collection":

a) For official statistical basic data (number of population, number of households, registered business entities and public utilities, registered vehicles and installed cold chambers and cold stores):

- Agency for Statistics of Bosnia and Herzegovina and both Institutes for Statistics of the Entities: Federation of BiH and Republika Srpska and Bureau of Statistics of the District Brcko - for all basic statistical data relevant for the preparation of analyses and estimations of installed quantities of HCFC refrigerants in existed appliances and air-condition and cooling installations in operation;

b) For import HCFCs and distribution at BiH market and import of equipment using HCFCs as refrigerant:

- Information Reports directly received from the Importers and Distributors of HCFCs (mainly HCFC-141b and HCFC-22) to BiH Market;
- Information on import of air-condition equipment using HCFCs as refrigerant and the list of Importers for years 2006 - 2010 received from the State Custom Office;
- Information on types and quantities of registered import of "split" and "unit"-types of air-condition equipment, using R-22 as refrigerant received from the State Custom Office and from 24 of the main Importers, who imported over 92% of the total quantity of this equipment in Bosnia and Herzegovina in the years 2006-2010.

c) For verification and consolidation of "on the desk" surveyed data on HCFCs import & distribution to BiH Market and installed quantities & consumption:

- Verification and control of HCFCs Import & Distribution to BiH Market, by years from 2003 to 2009 was done trough each registered, and from the year 2008 authorized and licensed importers, based on their submitted reports on imported HCFC quantities for this period and recorded in the UNIDO's Questionnaire for all particular importers who were registered by the State Custom Office;
- Data on HCFCs installed quantities in BiH Refrigeration commercial sector were collected through the direct surveying at site, using of an internal established model of questionnaires sent to more than 500 registered business, government and non-government entities (production and trade companies, hotels, restaurants, public utilities)
- Data on import and installation of air-condition equipment (mainly split and unitary types) with HCFC-22 refrigerant and installed quantities in BiH Air condition sub-sector were collected through the direct surveying at site, using of an internal established model of questionnaires sent to 24 (of the totally registered 86) the greatest importers and distributors of this equipment at BiH Market;
- Data on HCFCs consumption in BiH production and service sectors and main BiH Manufacturers and Service Shops in the Refrigeration Sector for surveyed quantities of installed HCFCs were collected through the direct surveying at site, using of an internal established model of questionnaires sent to more than 60 identified main

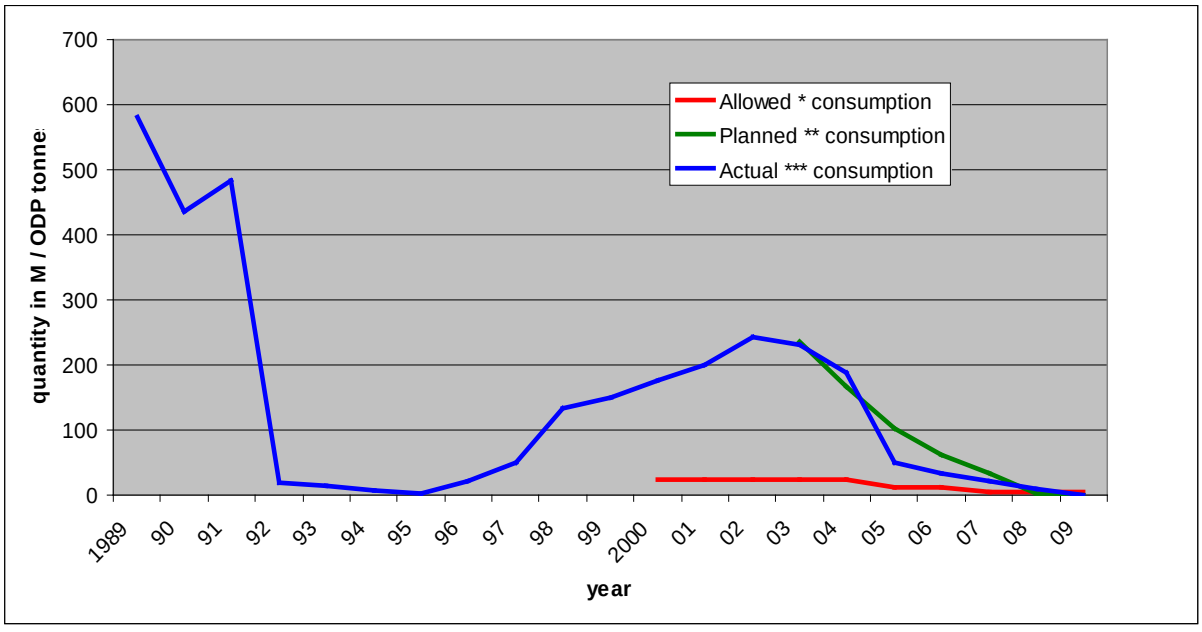
buyers of HCFCs at BiH Market (companies registered for production, assembling and maintenance of appliances and equipment using HCFCs) as well as from direct interviews done during the visit at site with 10 the biggest producers of insulation foam and refrigeration commercial appliances.

2.3. Consumption of CFCs in Bosnia and Herzegovina

On the Table 6 and Graph 1 billow are showing the actual annual quantities of the National CFCs consumption by years for the period 1989-2009 and compared with the allowed consumption based on the National CFC Baseline and the National CFCs Phase-out Plan and the Decision XV/30 of the 15th Meeting of the Parties to the Montreal Protocol of November 25, 2003.
Since January 2009, the import of CFCs (all control substances specified in the Annex A, Group I under the Montreal Protocol,) have been banned.

Table 6: Consumption of CFCs (Annex A, Group I substances) in Bosnia and Herzegovina in the period 1989-2009 (in M / ODP tonnes)

Year	1989	90	91	92	93	94	95	96	97	98	99	2000	01	02	03	04	05	06	07	08	09
Allowed * consumption												24	24	24	24	24	12	12	3.6	3.6	3.6
Planned ** consumption															235	167	102	63	33	3	0
Actual *** consumption	582	436	484	19.5	15.0	7.5	3.0	20.6	49	134	150	176	200	**244**	230	188	51	33	22	9	**0**



Graph 1: *Consumption of CFCs in BiH in the period 1989-2009 (in M / ODP tonnes)*

LEGEND:

* Allowed consumption of CFCs (in Metric / ODP tonnes) according to the established BiH Baseline

** Planned consumption according to (NOPP) Plan for CFCs phase-out and the Decision XV/30 of the 15th MOP of November 2003

** Actual annual consumption in BiH reported to the MLF and to the Ozone Secretariat

2.3.1. Statistical data for Bosnia and Herzegovina relevant for collection of HCFCs consumption (base: year of 2009)

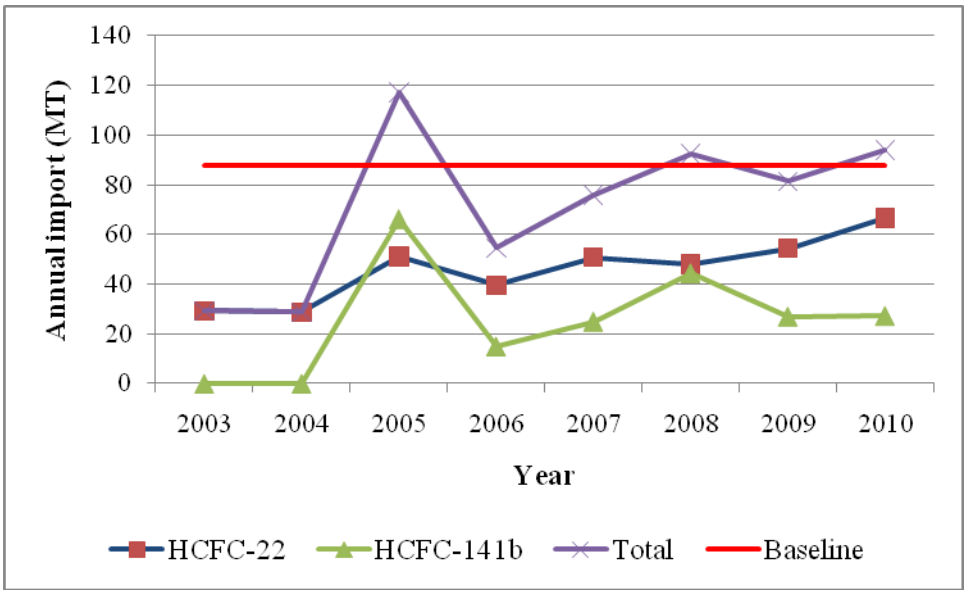
Total population:	3,843,301
Number of households:	1,054,613
Registered business and administration entities	
Food and pharmaceutical processing industry:	3,326
Health & Social works:	1,622
Hotels, restaurants & sport halls:	1,193
Wholesale and retail trade:	24,961
Public administration, communal & cultural institutions:	5,292
Financial and petrol services:	650
Registered transportation units-truck cooling chambers:	326

2.4. Consumption of HCFCs in Bosnia and Herzegovina

The data on annual HCFCs import / consumption in Bosnia and Herzegovina for the period 2003-2010 are shown in the Table 7 billow.

Table 7: Data on National HCFC Imports, by years from 2003 to 2010

Year	***Annual Import (MT)***		
	HCFC-22	***HCFC-141b***	***Total***
2003*	29.21	0.00	29.21
2004*	28.65	0.00	28.65
2005**	51.00	66.24	117.24
2006**	39.51	15.00	54.51
2007**	50.84	25.00	75.84
2008**	47.91	44.48	92.39
2009**	54.36	27.00	81.36
2010***	66.74	27.30	94.00
"BASE LINE" (average 2009-2010)	**60.55 (3.33 ODP t)**	**27.15 (2.99 ODP t)**	**87.70 (6.32 ODP t)**



Graph 2: ***Consumption of HCFCs in BiH in the period 2003-2010 (in M tonnes)***

LEGEND:

* *Data collected are based on: for years 2003-2004 - information received directly from the registered Importers, because during that period was not established Custom Office at State level and custom authorities were at the Entities' level, which never issued any reports on ODSs import;*

** *Data collected for years 2005-2009 based on the NOU and BiH Custom Office information and issued reports to the National (MoFTER) and International Authorities (MLF, Ozone Secretariat)*

*** *Latest data on HCFCs import received from the NOU and confirmed by the registered licensed importers; these data were reported from Bosnia and Herzegovina to the Ozone Secretariat (Data Report) and to the MLF (Progress Report) as the data of HCFCs import in 2010.*

2.5. Import and distribution of HCFCs and equipment containing HCFCs

2.5.1. List of HCFC Importers in BiH

In the table 8 below are listed the main Importers (trade and manufacturing companies) who were registered by the National Custom Authority and by the MoFTER / NOU as the authorized importers of HCFCs to Bosnia and Herzegovina, who already performed the import of all HCFCs quantities used for their own consumption needs (in their manufacturing process and / or for refrigeration / air-condition equipment servicing) as well as for distribution to BiH Market in one or more years during the period from 2003 to 2009.

Table 8: Registered and licensed Importers of HCFCs to Bosnia and Herzegovina from 2003- 2009

No.	*Name of Company*	*Address, contact data*
1	**SERVIS JELIĆ, Široki Brijeg***	Vaganska 4, 88220 Široki Brijeg , tel & fax: 387 39 705 675, E-mail: info@servis-jelic.com; Mr. Ivo Jelić, Director
2	**ELDOM, Tuzla**	Albina Herljevića 45, Tuzla, tel 035 282 233, 035 228 009, E-mail: smajic@bih.net.ba Mr. Jasmin Smajić, Director
3	**SLATKOM Alfa & Omega, Banja Luka**	The company transferred its business to Africa; Does not exist more in BiH Market
4	**KLIMOTEHNA, Sarajevo***	Ul. Velikih Drveta 6, 71000 Sarajevo; Tel. 387 33 767 075; Fax: 387 33 76 70 76; E-mail: klimtech@bih.net.ba , Mr. Abdulah Turković, Director
5	**EKO ELEKTRO FRIGO, Banja Luka**	Pave Radana 51, Banja Luka, tel. 387 51 323 182, fax. 387 51 323 180 Mr. Bugarski Zoran, Director
6	**ORDAGIĆ, Srebrenik***	9. septembra 11, Srebrenik, tel & fax.: 387 35 643 440 i 642-950, ordagicdoo@bih.net.ba , Muhamed Ordagić, Director
7	**AN-GO FRIGO ELEKTRIC, Prijedor**	Kralja Aleksandra bb, Prijedor, tel. & fax. 387 52 233 770, an-go@poen.net, Goran Šobot, Director
8	**BIRA, Bihać**	Jablanska bb, Bihać; tel. 037 311 095, fax.387 37 311 784, bira@bih.net.ba, Mr. Edin Muslić, Director
9	**ELEKTRO FRIGO, Banja Luka**	Braće Potkonjaka 15 A, B. Luka; tel. i fax. 051 466 166, elektrof@teol.net, Mr. Nenad Džilit, Director
10	**HBM, Vitez**	Kamenjače bb, 72250 Vitez, tel. 387 30 717 218, fax. 387 30 717 219, Ms. Ankica Mlakic, Director
11	**ALTERNATIVA, Sarajevo***	Put Famosa 38, 71212 Hrasnica-Sarajevo, tel. 387 33 475 850, fax. 387 33 475 860, info@alternativa.ba, Mr. Salih Lemeš, Director
12	**MASTER FRIGO, B. Luka***	Put srpskih branilaca 332a, 78 000 Banja Luka; tel: 387 51 389 800, fax. 051 389 802, E-mail: masterfrigo@poen.net , Ms. Dijana Stanković, Director
13	**POLIOLCHEM, Tuzla***	M.P.Đurina bb, 75000 Tuzla, Tel: 387 35 288 866, Fax. 387 35 288 867
14	**FRIGO KLIMA I HLADJENJE, Sarajevo***	Blažujski drum 4, 71 000 Sarajevo, Tel: 387 33 762 111, Fax. 387 33 762 112, E-mail: info@mbfrigo.ba, Mr. Siniša Trifunović, Director
15	**JOKO, Široki Brijeg***	Knešpolje bb, 88220 Široki Brijeg; Tel & Fax: 387 39 701 331, Ms. Tanja Bubalo, Director

The Importers marked with (*) are licensed importers (with the obtained Import Licenses from MoFTER) from the year of 2008 (since the Import Licensing System had been put in place in Bosnia and Herzegovina). These companies were the only Importers of HCFCs during the last two years (2008 & 2009), who imported 100% of the total registered import of these substances.

2.5.2. Prices of HCFCs

Table 9: Prices of HCFC in BiH (imported prices, without Custom Tax and VAT)

Year	**2008**		**2009**	
HCFC Substance	HCFC-141b	HCFC-22	HCFC-141b	HCFC-22
Total amount imported (kg)	44,476	45,152	27,000	51,573
Total value of imported (€)	167,712	159,433	89,127	159,585
Average price (€/kg)	1.93	1.81	1.69	1.58
Max. price (€/kg)	2.15	2.15	1.77	3.36
Min. price (€/kg)	1.44	1.49	1.67	0.99

2.5.3. Distributors HCFCs to BiH Market

Table 10: List of main HCFC Distributors

No.	***Name of Company***	***Address, contact data***	***Geographic area of (main) distribution coverage***	***Types of HCFC distributed***
1	**SERVIS JELIĆ, Široki Brijeg**	Vaganska 4, 88220 Široki Brijeg Tel & Fax: 387 39 705 675, E-mail: info@servis-jelic.com; Mr. Ivo Jelić, Director	Entire Bosnia and Herzegovina	HCFC-22, HCFC-141b
2	**KLIMOTEHNA, Sarajevo**	Ul. Velikih Drveta 6, 71000 Sarajevo; Tel. 387 33 767 075; Fax: 387 33 76 70 76; E-mail: klimtech@bih.net.ba Mr. Abdulah Turković, Director	Entire Bosnia and Herzegovina	HCFC-22
3	**HBM, Vitez**	Kamenjače bb, 72250 Vitez, Tel. 387 30 717 218, Fax. 387 30 717 219, Ms. Ankica Mlakic, Director	Entity Federation of BiH	HCFC-22 HCFC-141b
4	**MB FRIGO KLIMA I HLADJENJE, Sarajevo**	Blažujski drum 4, 71 000 Sarajevo, Tel: 387 33 762 111; Fax: 387 33 762 112 E-mail: info@mbfrigo.ba Mr. Siniša Trifunović, Director	Entity Federation of BiH	HCFC-22
5	**JOKO, Široki Brijeg**	Knešpolje bb, 88220 Široki Brijeg; Tel & Fax: 387 39 701 331 Ms. Tanja Bubalo, Director	Entity Federation of BiH	HCFC-22
6	**MASTER FRIGO, Banja Luka**	Put srpskih branilaca 332a, 78 000 B. Luka; Tel: 387 51 389 800, Fax. 051 389 802, E-mail:masterfrigo@poen.net Ms. Dijana Stanković, Director	Entity Republika Srpska and District Brcko	HCFC-22
7	**POLIOLCHEM, Tuzla**	M.P.Đurina bb, 75000 Tuzla, Tel: 387 35 288 866, Fax. 387 35 288 867	Entity Federation of BiH	HCFC-141b
8	**ALTERNATIVA, Sarajevo**	Put Famosa 38, 71212 Hrasnica-Sarajevo, tel. 387 33 475 850, fax. 387 33 475 860, info@alternativa.ba, Mr. Salih Lemeš, Director	Entire Bosnia and Herzegovina	Pre-mixed Polyol with R-141b

In the table 10 above are listed the main HCFC Distributors to BiH Market (companies for trade and retailed selling) who were registered by the National Custom Authority and by the MoFTER / NOU for the years 2008 and 2009 as the authorized importers of HCFCs to Bosnia and Herzegovina and their distributors / retail selling at the local market.

The companies "POLIOLCHEM" and "ALTERNATIVA" were producers during certain period of blended Polyol, mainly for their own manufacturing process and production (blended Polyol with HCFC-141b and rigid foam) and partially for distribution to other

refrigeration manufacturers in Bosnia and Herzegovina for their commercial refrigeration production process.

2.6. Import and installation of air-condition equipment up to 2009 and forecasting of import for the period 2010-2012

In the table 11 billow are shown registered and / or estimated import of air-condition equipment unitary, split and other types in the period 2003-2009

Table 11: Import of air-condition equipment, all types and with all refrigerants types

Item	***Type***	***Quantity of imported units, by years (sets)***							
		2003**	**2004****	**2005***	**2006***	**2007***	**2008***	**2009***	**TOTAL**
1	Unitary type	366	530	648	596	1,880	858	629	**5,507**
2	Split type	13,800	15,600	18,745	18,813	26,135	36,230	35,947	**165,270**
3	Other types	120	320	276	104	1,260	1,156	1,260	**4,496**
Total		**14,286**	**16,450**	**19,669**	**19,513**	**29,275**	**38,244**	**37,836**	**175,273**

Legend: ******* *Registered import by the State Custom Authority and verified trough to information / reports received from the 20 the biggest importers of this equipment to BiH*
******** *Estimated imported and installed quantities*

Unfortunately, the tariff system and registration of imported refrigeration and air condition appliances (unitary, split and other units), as well as statistical system for registration of import of goods in Bosnia and Herzegovina does not allow an identification of real imported quantities of those goods and getting information of basic elements that define them: type of unit, producer, power (kW), type and quantity of refrigerant charging.

Data of imported contingents of this equipment, registered by the State Custom Authority of BiH, that were used for determining of imported quantities of particular units, include only: tariff code (according to which, based on the valid "Tariff Regulation on the Classification of Goods Imported into BiH" basic type of imported equipment can be recognized), total mass and price (without custom duty and VAT) of imported contingent and country of origin of this contingent.

Based on above mentioned data, that the State Custom Authority made available to the national team for the preparation of the HPMP, total imported quantities were calculated and are shown for the period of 2005 – 2009 and estimated imported quantity for the period 2003 – 2004 (when the State Custom Authority did not made any evidence and reports of imported units / equipment). Since in the period were evidence has been made and today, the evidence of imported quantities includes only basic information: mass of certain types of units in an import contingent / lot and import price, there is no exact evidence about units or sets of imported equipment.

Therefore for the analysis of imported (and installed) quantities of air condition appliances (in units) the following calculation method is used:

- Average weight of imported units ("split", unitary and other types): 65 kg
- Average capacity / power (in kW) of imported devices: 5 kW / unit

By direct surveying at site and interviews done with the most of 20 main importers, who have a share of more than 90% of total import of air-condition equipment in the period 2005 – 2009, it was possible to determine and to verify with a relative high assurance the total of estimated imported quantities of different types of this equipment for this period (estimated to total number of 175,273 units), which is shown in the table 11 above, and also to estimate a ratio between the use of HCFC-22 refrigerant and other alternative substances in this equipment – 85 % (about 150,000 units) with HCFC-22 and the rest of 15% with other bland refrigerants (407c and 410a).

The reasons for so large participation of air condition equipment – unitary and split types charging with HCFC-22 refrigerant in the total quantities of this imported equipment which was mostly origin from the Asia region countries (China, Singapore, Hong Kong), with the dominant refrigerant R-22, are their much lower prices of the equipment and such refrigerant at the World market comparing with the similar equipment charged with the HFC bands (R-407c and R-410a).

Having into consideration that almost 100% of air-condition units imported and installed in the period before 2003 are operating with R-22 refrigerant, and the still operating number of this equipment is estimated to approx. 30.000, the total number of operating these air-condition appliances is estimated to **180,000** units.

2.7. Installed quantity of HCFC-22 in refrigeration and air-condition appliances

2.7.1. Installed HCFCs in air-condition appliances and cooling systems

***Table 12:** Estimation of installed quantities of HCFC-22 refrigerant in air-condition appliances and annual needs for servicing*

*Total number of installed units in operation**	*Average installed qty of HCFC-22 (kg/ unit) **	*Total installed qty of HCFC-22 (kg)*	*Annual leakage of refrigerant (%)*	*Total annual leakage (kg)*	*Estimation on annual needs for servicing in 2010 (kg)*
180,000	1.2	216,000	15%	32,400	**32,400**

Legend:

***** *Total number of installed units is based on estimated quantities of these appliances operating in 2009, taking into consideration that about 90% of all installed units use HCFC-22 as refrigerant*

****** *Average use of HCFC-22 refrigerant in air-condition appliances of average capacity / power of 4 kW and distance between two „split"–type units of 4m is estimated to 1.2 kg of refrigerant per unit/set*

Presented data on import of different types of unitary, split and other types of air condition equipment in Bosnia and Herzegovina in the period 2003 – 2009, with HCFC-22 as

refrigerant, is a good basis to determine (existing) installed quantities of refrigeration and air-condition equipment. It is assumed that all imported and installed quantities in different appliances in BiH during this period are still in operation condition. An estimation of needed quantities for their servicing in the next three-year period (2010-2012) has been done having in mind expected (estimated) such gradually decreased annually import of these appliances during this period, compared with the significant increased import in the period 2007-2009 and expected good operating conditions of the previously installed appliances.

The surveyed and estimated data (by years) of imported and installed quantities of the mentioned types of air condition appliances, shown in the Table 12 above, are determined on the following basis:

- Data on imported goods – refrigeration and air condition equipment for the period 2005 – 2009, received from the Custom Authority Register, and verified by the most of the greatest importers / distributors of this equipment to BiH market.
- Data on estimated import for the period 2003 and 2004, are based on average registered annual import for the period 2005 – 2009, reduced by 15–20%

In accordance with the experiences from the practice, a life time of these air-condition appliances is 8-10 years; Taking into consideration this facts, it is estimated that the end of the year 2009 there were in operations about 180,000 of these imported and installed units in Bosnia and Herzegovina, operating with R-22 refrigerant. This installed quantity will, together with a new supply (import and installation) of these categories of air-condition equipment for a few next year's need, in spite of expecting decreasing of such annually import in the period 2010-2012 will be the certain needs of HCFC-22 refrigerant for the maintenance of such equipment.

2.7.2. Forecasting for import and installation of air-condition equipment with HCFC – 22 and this refrigerant consumption needs for servicing in the period 2010 – 2012

Forecasting data on the future HCFCs and equipment containing HCFCs import and consumption in BiH were collected through the direct surveying at site, using of an internal established model of questionnaires sent to more than 60 identified main buyers of HCFCs at BiH Market (companies registered for production, assembling and maintenance of appliances and equipment using HCFCs) as well as from direct interviews done during the visit at site with 10 the biggest producers and services of refrigeration commercial appliances.
This forecasting was done on the base of information received from the main BiH registered importers, assemblers and service shops who imported last a few years, installed and serviced over 80% of the total imported and installed air condition equipment in Bosnia and Herzegovina.

In the table 13 billow are shown the data on forecasting – estimation of import of air-condition equipment and estimation of annual needs, for the period 2010-2012 of refrigerant HCFC-22 for servicing of the equipment already installed.

***Table 13**: Estimation of the import of air-condition equipment and annual needs of refrigerant HCF-22 (R-22) for servicing of these appliances for period 2010-2012*

Item	*Type*	*Estimation for quantity of imported units, with R-22 refrigerant and installed quantities of R-22*						*Estimation of annual needs for servicing*					
		Estimated import and installation of air-condition equipment			*Increase of installed R-22 quantities * ((kg)*			*Expected total of installed quantities of R-22 (based on 2009 as starting year)***			*Estimation of annual needs of R-22 for servicing of installed devices****		
		2010	**2011**	**2012**	**2010**	**2011**	**2012**	**2010**	**2011**	**2012**	**2010**	**2011**	**2012**
1	Unitary type	1,000	880	680									
2	Split type	24,800	20,000	16,500									
3	Other types	500	420	350									
	Total	**26,300**	**21,300**	**17,530**	**31,560**	**25,560**	**21,036**	**236,760**	**250,482**	**258,994**	**35,514**	**35,572**	**38,850**

***Legend**:*

** Increase of installed quantities of HCFC-22, by years taking into consideration annual new installations of air-condition equipment - split and unitary types*

*** Estimated installed total quantities of HCFC-22, taking into consideration installed quantities, based on the year 2009 (216,000 kg) with 5% annual reduction from the operation of already installed capacities from the previous year and actual annual increase of newly installed capacities*

**** Annual needs of the refrigerant HCFC-22 for installed equipment servicing purposes are estimated to an annual amount, taking into consideration an average annual losing / leakage of 15% of the refrigerant R-22 in already installed installations.*

2.8. Commercial refrigeration devices and cooling systems

2.8.1. Cold stores and cold chambers

Table 14: Installed quantities of HCFC-22 in Agriculture-Fruit and Vegetable Cold Storage

Administrative units	**Total capacity of cold stores (tonne)***	**Total cooled space of cold stores (m^3)***	**Increase of cold stores installed capacities in the period 2006-2009 (m^3)****	**Total cooled space of cold stores in 2009 (m^3)**	**Estimated total space of cold stores with R-22 refrigerant (m^3)*****	**Average use of R-22 in cold stores installations kg/m^3********	**Total estimated installed quantity of R-22 in cold stores (kg)**
Federation of BiH	19,011	7,604	4,600	12,204	4,882	0.35	**1,953**
Republika Srpska	36,123	14,410	8,800	23,210	9,284	0.35	**3,714**
Brčko District	2,517	1,007	400	1,407	562	0.35	**225**
Total BiH	57,651	23,021	13,800	32,821	14,728	0.35	**5,892**

Legend:

***** *Data on installed capacities of cold stores in the year of 2005 (Source of information: Ministry of Agriculture, Forestry and Water Management of Federation BiH,* Sarajevo 2005)

****** *Estimated increase of cold stores capacities in BiH in the period 2005-2009 (data collected from the Site)*

******* *There is estimated, on the base of investigated data from the Site, that 40% of total existed and operating cold stores are with R-22 refrigerant (most of them constructed before 2005)*

******** *Having into consideration, the investigated data from about 60 operating projects, it is evident that the charging of HCFC-22 refrigerant in cold stores and cold chambers installations wearied from 0.25 to 0.45 kg/m^3 of cooling space. So, an average calculated charging of R-22 refrigerant in cold stores is **0.35** kg / m^3 of refrigeration space*

***Table 15**: Installed quantities of HCFC-22 in cold stores and chambers in Industry and Trade sectors*

HCFC End users –Industrial sectors	**Total (estimated) refrigeration capacity of cold stores*(*)* (m^3)**				**Total estimated installed quantities of HCFC-22 (kg)**
	Federation BiH *(1)*	**Republika Srpska** *(2)*	**District Brcko** *(3)*	**Total installed capacities in BiH**	
Wholesale and Retail Trade	30,739	18,500	3,200	52,439	18,354
Other Industries and Public Sector	37,282	20,400	2,600	60,282	21,100
Total	**68,021**	**38,900**	**5,800**	**112,721**	**39,454**

Legend:
***(*)** Estimation of cold stores and cold chambers capacities in both BiH Entities: Federation of BiH and Republika Srpska , as well as from the District Brcko are based on the real investigation from the site and information received from the main BiH servicing organizations who are doing more than 70 of maintenance services at the end users of these facilities*

***Table 16**: Summary of installed quantities of HCFC-22 in existed cold stores and cold chambers in BiH for all sectors and estimation of needs for servicing*

BiH Administrative Units	*Installed quantities of HCFC-22 (kg)*			*Estimation of annual needs for servicing (kg)*					
	Agriculture and Food Processing Industries	*Industry, Public and Trade Sectors*	*Total installed quantities*	*Expected total of installed quantities of R-22 (based on 2009 as starting year) (1)*			*Estimation of annual needs of R-22 for servicing of installed devices (2)*		
	(base year 2009)		**2009**	**2010**	**2011**	**2012**	**2010**	**2011**	**2012**
Grand Total BiH	**5,892**	**39,454**	**45,346**	**47,613**	**49,994**	**52,494**	**9,523**	**10,000**	**10,500**

Legend:
- ***(1)*** *The estimated increase of cold stores and cold chambers' installation, charged with R-22 is by 5% annually and an assumption that all operating facilities in 2009 will stay in function also during the period 2010-2012*
- ***(2)*** *Estimation of needs for refrigerant R-22 for servicing is 20% of installed quantities annually, taking into consideration that the most of existed cold stores facilities, charged with R-22 are between 10 and 30 years old*

2.8.2. Commercial refrigeration equipment

Food processing and commercial refrigeration sector is the third largest sector with installed quantities of HCFC-22 refrigerant and certain needs for servicing of this installed and operating equipment and will considerably contribute to increased HCFC-22 consumption in coming years.

The main commercial refrigeration equipment in this sector is equipment used in food and beverage processing industry, wholesale and retail trade shops, hotels and restaurants such as bottle coolers, display cabinets, ice cream freezers used in shops and supermarkets, display cases in shops and restaurants and small chillers.

Table 17: Installed quantities of HCFC-22 in commercial refrigeration equipment (vertical & horizontal cold showcases and cold cupboards)-based year 2009

Business sector	Total number of registered business units	Estimated number of commercial refrigeration units/ business unit	Number of commercial refrigeration units	Total number of units charged with R-22 *(1)*	Average charging of R-22 /unit (kg)	Total installed quantity of R-22 (kg)
Food industry	3,326	2	6,652			
Wholesale and retail trade	24,961	1.5	37,442			
Hotels and restaurants	1,193	2	2,386			
Health and social works	1,622	0.5	831			
Public, communal and cultural	5,292	0.2	1,058			
Financial and petrol services	650	2	1,300			
Total	**37,402**		49,669	29,801	0.6	**17,880**

Legend: ***(1)*** *It is estimated that approx. 60% of the total installed commercial refrigeration units (vertical and horizontal show cases and cold cabinets) are charged with HCFC-22 refrigerant of an average of 0.6 kg/ per unit*

There are expectations of a very limited increase of quantities of these appliances charged with R-22 which will be supplied to BiH Market in coming years (2010-2012). Most of them would be domestic products, and some may be imported as secondary used equipment from abroad, what was the case with the import of this category equipment used CFC-12 as the refrigerant in the period before 2006, when this equipment import was banded in Bosnia and Herzegovina

2.9. Water Chillers

There are not any official or registered data or information on installed water chillers and nor any data of their operating refrigerants and installed quantities of HCFC-22 refrigerant in these facilities.
During the surveying of HCFC installed quantities done at site, with the main assistance of some the best and the greatest BiH service shops that are in the same time the biggest buyers and users of R-22 refrigerant, mainly for the purpose of its use for maintenance and servicing of cooling systems in the country, there were recognized and identified over 40 cooling facilities with installed and still operating chillers. Most of these chillers are installed as cooling systems mainly in hospitals and other medical institutions, wholesale trade centers, industrial manufactories, hotels and other administration buildings.
The total cooling space of these recognized chillers overcomes 2,500,000 m^3, and there particular installed power capacities are between 40 and 300 kW. About 40% of these chillers are operating with R-22 charged refrigerant and its particular installed – charging quantities are between 20 and 300 kg / unit. The others chillers are operating with refrigerants: R-407c, R-410a, R-134a and ammonia.
Having into consideration these investigations at site, there is such estimation that in Bosnia and Herzegovina are still operating about 90-100 water chillers with installed quantities of refrigerant R-22 about **14,000** kg

There are no expectations for any increase of new water chillers installation charged with R-22 refrigerant in the period 2011-2012.

On the billow Table 18 are listed installed and operating water-chillers charged with R-22 refrigerant in the public medical institutions which retrofitting and/or replacement can be a subject of a pilot "umbrella project" with conversions of refrigerant R-22 to non-HCFC once.

Table 18: Installed chillers charged with R-22 refrigerant in the public medical institutions

	Name of public medical institution	*Number of intalled chillers*	*Power of generator (kW)*	*Installed quantity of R-22 by chillers*	*Total installed quantity of R-22 (kg)*
1	Croatian Hospital „Dr. Fra Mato Bilić", Nova Bila	4	2x153+2x34	2x100+2x20	**240**
2	Clinic Centre of the University Sarajevo, Sarajevo	2	3x90+3x90	270+270	**540**
3	General Hospital „Abdulah Nakaš", Sarajevo	2	2x34	29+29	**58**
4	Clinic Hospital Mostar, Mostar	4	4x2x90	4x120	**480**
5	Clinic Center in Banja Luka	3	315+160+194	300+150+430	**880**
6	Medicinska elektronika, B. Luka	2	2x75	60+60	**120**
GRAND TOTAL INSTALLED R-22		**17**			**2,318**

2.10. Transport refrigeration

Transportation refrigeration sector comprises transport vehicles in food processing industry, dairy industry, wholesale and trade centres, and in a wery small share some transport busses whose air-condition equipment is charged with HCFC-22. Unfortunately, these kinds of vehicles are not registered in the both Entities' Ministries of Internal Affairs (where is official annual registration of all operating transport means) by this category of vehicles, but just as "transport vehicles" of different carrying capacity (in tone).

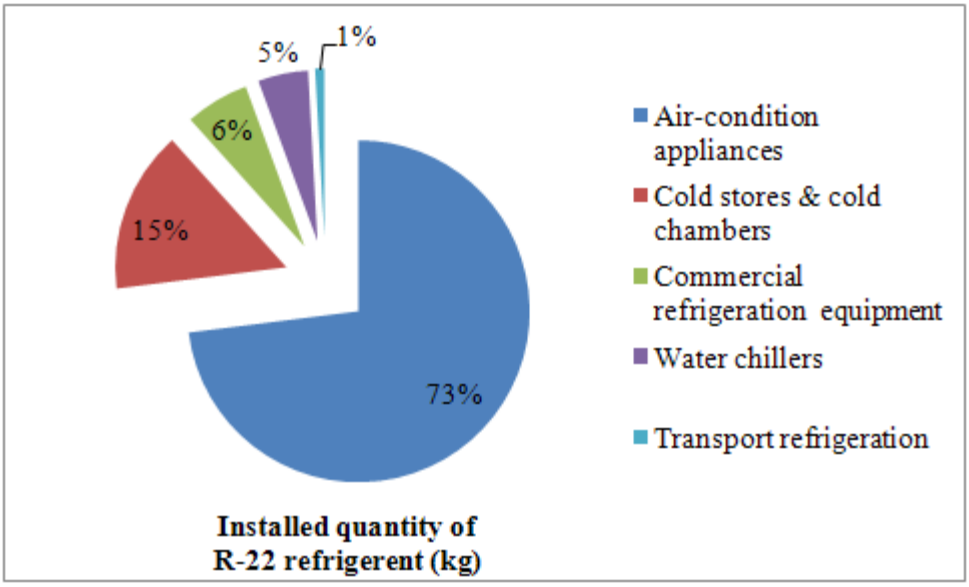
The data on operating transport refrigeration vehicles are (about 60% of the estimated ones) collected from vareous service workshops that work on the maintenance of these refrigeration appliances. The rest of estimated operating vehicles (about 40 %) is an estimation of the HPMP working team.
According to these information and estimations, in Bosnia and Herzegovina are operating about 128 big refrigeration trucks and about 340 refrigeration vans and pickups; It is estimated that about 60% of these car's refrigeration apliences are operating with R-22 refrigerant.
The average charging of R-22 in these appliancs are estimated to:
- in refrigeration trucks: 18 kg
- in refrigeration vans and pickups: 6 kg
So, the **installed quantities of R-22 in operating vehicles** are estimated to:
128 x 0.6 x 18kg + 340 x 0.6 x 6kg = **2,606 kg**

There is only one producer of refrigeration appliences for the transportation means – refrigeration vehicles. This is the enterprise "KUCA LEDA" from Mostar. This company is building-assembling wehicle cold chambers on standard vehicles –trucks, pick-ups and vans.

So, there are expectations that this company will continue in the future to produce these appliances with R-22 refrigerant may be during the period 2010-2012 if demand of the domestic BiH Market will ask for that.

Table 19: Sumary of installed quantities and forcasting of HCFC-22 needs for servicing in operating refrigeration and cooling facilities

Sector	*Installed quantity of R-22 refrigerant (kg)*					*Annual needs of R-22 for servicing*				
	Base year	*Share ratio (%)*	*Forecast of total installed quantities, by years (kg)*			*Forecast of total needs for servicing (kg)*				
	2009		**2010**	**2011**	**2012**	*Annual leakage rate (%)*	**2009**	**2010**	**2011**	**2012**
Air-condition appliances	**216,000**	73.1	236,760	250,482	258,994	**15 %**	32,400	35,514	37,572	38,850
Cold stores & cold chambers	**45,346**	15.3	47,613	49,994	52,494	**15%**	6,802	7,142	7,499	7,874
Commercial refrigeration equipment	**17,880**	6.0	18,774	19,713	19,000	**20 %**	3,576	3,755	3,943	3,800
Water chillers	**14,000**	4.7	14,000	14,000	14,000	**20 %**	2,800	2,800	2,800	2,800
Transport refrigeration	**2,606**	0.9	2,950	2,850	2,800	**30 %**	885	855	840	825
Total	**295,832**	**100**	**319,997**	**337,317**	**347,288**		**46,463**	**50,086**	**52,654**	**54,149**



Graph 2: Share of installed quantities of HCFC-22 refrigerant in refrigeration and air-condition sectors – base year: 2009

2.11. HCFC consumption in manufacture sector

2.11.1. Consumption of HCFC-141b in rigid foam production

There is only one currently operating manufactoring company – producer of polyurethane rigid foam and sandwich insulation panels and pri-blended Polyol System in Bosnia and Herzegovina, using HCFC-141b as a foam blowing agent. This is the manufactoring company "ALTERNATIVA" from Hrasnica, Sarajevo.
The annual consumption of HCFC-141b in this company in the period 2005-2010 is shown in Table 20 billow.

Table 20: Annual consumption of HCFC-141b in the manufacture company "ALTERNATIVA"

Year	*Annual consumption (kg)*	*Note*
2005	12,300	Consumption within the purchased pri-blended Polyol from system huse producer "POLIOLCHEM" Tuzla, BiH
2006	15,600	Self imported quantities of R-141b and blended with Polyol in the factory
2007	24,800	dito
2008	22,900	dito
2009	23,400	Consumption within the purchased Polyol pri-blended with R-141b supplied from the system house producer "POLIOLCHEM", Tuzla (BiH)
2010	21,300	Consumption within the purchased imported Polyol pri-blended with R-141b
Average consumption last four years (2007-2010)	**23,100**	

The other consumers of the HCFC-141b in manufacture sector are some small and medium size enterprises, producers and assemblers of commercial refrigeration appliences, such as: cold chambers, cold stores, water cooling chillers, refrigeration trucs cold chambers, cold shaw and and

2.11.2. Consumption of HCFC-22 in commercial refrigeration manifacture

There are no companies in Bosnia and Herzegovina in the refrigeration and air-conditioning sectors manufacturing basic equipments/components which contain or use HCFC refrigerants, but there are some manufactoring companies constructing commercial refrigeration facilities (cold chambers and cold stores) as well as manufactoring of commercial refrigeration appliances (display cases and cold cabinets) using foam blowing agent HCFC-141b in production of insulation rigid foam and refrigerant HCFC-22 for charging of commercial refrigeration appliances.
Otherwise, approximately 75-80 % of the total annual consumption of HCFC-22 in Bosnia and Herzegovina last a few years was used for the maintenance / servicing of existed operated refrigeration, cooling and air-condition facilities and about 20-25 % of this refrigerant imported quantities were used in production –charging of this commercial refrigeration equipment and charging of air-condition facilities first assembling installation.

The total HCFC-22 consumption in the refrigeration and air-condition service sector for the base year 2009 is estimated to **46,500** kg **(46.5 Mt**), while the total consumption of this substance in manufacturing sector in Bosnia and Herzegovina is estimated to around **15 Mt** .

In the Table 21 billow are shown the biggest recognised consumers of HCFC-22 refrigerant in Bosnia and Herzegovina in Refrigeration commercial equipment manufacturing sector (producers of commercial refrigeration facilities), and their annual consumption in the past four years (2007-2010), their Base-line consumption and forcusting of their consumption in the period 2011-2012.

Table 21: Annual consumption of HCFC-22 by the biggest consummers in BiH in Refrigeration Manufacture Sector

Company-commercial refrigeration appliences manufacturer	***Annual consumption by years (kg)[1)]***				***Base-line consumption 2009-2010 (kg)***	***Forcasting consumption 2011-2012 (kg)***	
	2007	***2008***	***2009***	***2010***	***2009-2010***	***2011***	***2012***
"ORDAGIC", *Srabrenik*	4,760	6,280	5,890	5,200	**5,545**	4,200	3,800
"SOKO-RKT", *Mostar*	4,400	5,100	4,120	3,800	**3,960**	3,600	3,200
"KUCA LEDA", *Mostar*	1,650	1,720	1,410	1,350	**1,380**	1,100	980
"EKO FRIGO", *B. Luka*	1,350	1,480	1,320	1,250	**1,285**	1,100	1,000
"ELEKTRO FRIGO" *B.Luka*	1,220	1,100	1,150	1080	**1,115**	980	920
"FRIGOKLIMA" *B. Luka*	1,195	1,215	1,055	985	**1,020**	920	860
TOTAL	**14,575**	**16,895**	**14,945**	**13,665**	**14,305**	**11,900**	**10,760**

Legend: *[1)] Sorce of information: Filled written quastionnaries, received from the listed companies; the received data were revised after wisiting of these companies at site*

2.12. HCFC alternatives

Table 22: Eligible HCFC alternatives – for use in foam production and in refrigeration and air-condition sub-sectors

Product / Sector	***Used HCFC***	***HCFC alternatives***	
		for retrofitting	***for new installations***
Production of polyurethane rigid foam - insulation sandwich panels	R-141b		n-Pentane, (CO_2) water, hydrocarbons (HFC)
Production of polyurethane insulation foam in refrigeration commercial appliances	R-141b		cyclo-Pentane hydrocarbons
Refrigeration commercial appliances – industrial refrigeration and cooling systems	R-22	R-407c	R-407c, R-410a, Ammonia
Small commercial refrigeration equipment	R-22	R-404a	R-404a,
Commercial refrigeration equipment –middle & low temperature (cold stores & chambers)	R-22	R-404a	R-404a, R-507, R-134a
Water cooling chillers	R-22		R-134a, R-407c, R-410a Ammonia
Air-conditioning (split & unitary) equipment	R-22	R-407c	R-407c, R-410a; R-134a
Transport refrigeration	R-22		R-404a; R-134a

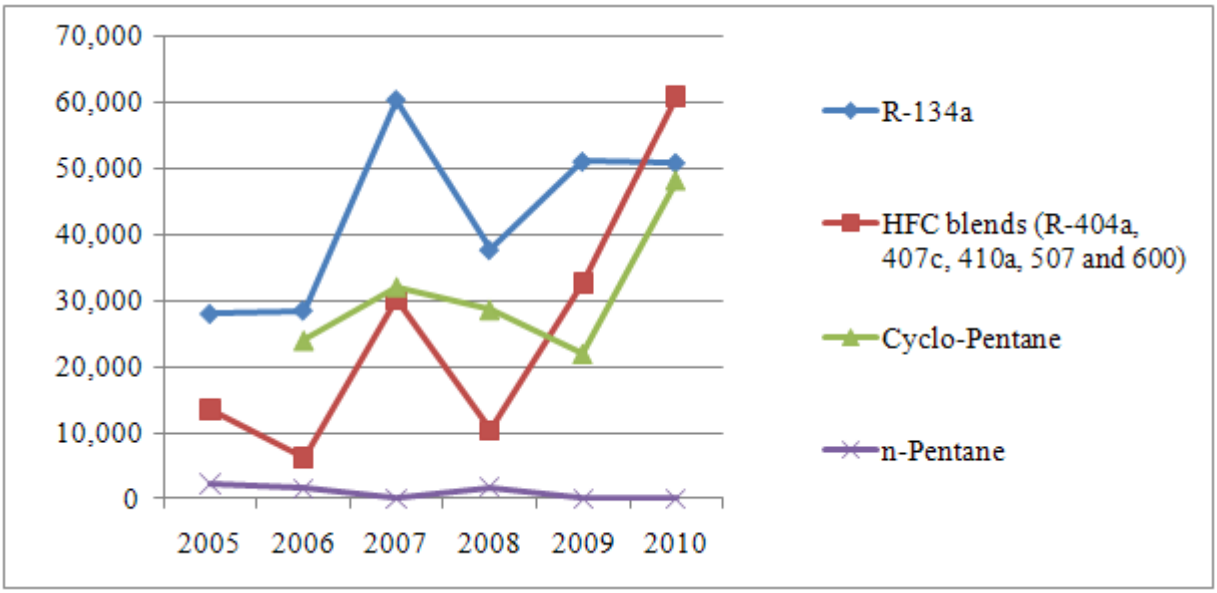
2.12.1. Conversion of HCFCs to eligible alternatives

2.12.2. Consumption of HCFC alternatives for the period 2005-2010

Due to the fact that the import of HCFC alternative refrigerants –like R-134a and HFC blends such as R-404a, 407c, 410a, 507 and 600 is not regulated by any national regulations, (and nor by the License and Import Quota System at place) and it is on a free import regime, as well as the equipment containing or use these substances, there are not any issued import quotas or import permits. The same legislative situation is with the import of foam blowing agents- chemicals n-pentane and cyclo-pentane, and the data collected on their import and consumption for rigid foam production are collected directly from the two main end users: "BIRA", Bihac, producer of domestic refrigeration appliances and "STIROKART", Srbac, producer of rigid foam sandwich pannels.

Table 23: Consumption of HCFC alternatives in BiH for the period 2005-2010

Year	*Refrigerant (kg)*				
	R-134a	*HFC blends (R-404a, 407c, 410a, 507 and 600)*	*Cyclo-Pentane*	*n-Pentane*	*others*
2005	27,990	13,525		2,300	
2006	28,495	6,176	24,000	1,600	
2007	60,279	30,113	32,000		
2008	37,624	10,330	28,600	1,800	
2009	50,950	32,540	22,000		
2010	50,741	60,814	48,000		



Graph 4: Annual consumption of HCFC alternatives in BiH for the period 2005-2010

Table 24: Prices of HCFs and blends in BiH (imported prices, without Custom Tax and VAT)

Year	2008					2009				
Substance	R-134a	R-404a	R-407c	R-410a	cyclo-P	R-134a	R-404a	R-407c	R-410a	cyclo-P
Average price (€/kg)	6.06	7.23	6.72	6.92	1.94	6.85	7.89	7.36	7.34	1.95

3. SELECTION OF PRIORITY AREAS OF POLICY AND CONVERSION INTERVENTIONS FOR THE IMPLEMENTATION OF HPMP STAGE 1.

3.1. General strategy

3.1.1. Commitments of the Article 5 countries

The phase-out schedule for HCFCs for Article 5 countries agreed at the XIX MOP (Decision XIX/6) includes the following:
– Baseline: Average 2009-2010 consumption
– Freeze at baseline level: 2013
– 10 % reduction: 2015
– 35% reduction: 2020
– 67.5 % reduction: 2025
– 100 % reduction: 2030 except 2.5% for servicing use: 2030
– 100 % reduction: 2040

3.1.2. HCFC Phase-out Programme for Bosnia and Herzegovina

The HCFC phase-out strategy of Bosnia and Herzegovina should be created and adopted trough the process of consideration and adoption of HPMP as the strategic document of the Country for its target to continue implementation of the Montreal Protocol and Phase-out Plan of the remaining ODSs.

If the Country wants to become the member of the European Union, what is expected to be achieved by the year of 2020, then the implementation of the Stage 1 and the Stage 2 of the HPMP should be completed till that year, and phase-out of HCFC consumption be done by 2020, with may be remaining of HCFC-22 annual consumption in an amount up to 8% necessary for servicing earlier installed refrigeration and air-conditioning facilities.
This can be the frame policy of the Country for adopting of such Programme of activities in two phases / stages:

Stage 1:

– Baseline: Average consumption 2009-2010
– Freeze at baseline level: 2013
– 30% reduction: by 2015

Stage 2:

- 40 % reduction: by 2016
- 70 % reduction: by 2018
- 95 % reduction: by 2020
-100 % phase-out: by 2030

3.2. Selection of priority areas of policy and conversion interventions for the implementation of HPMP Stage 1

The frame priority areas of the Country's policy and interventions for the implementation of the HPMP-Stage 1 which will enable to implement the targeted reduction of HCFCs consumption by 20 % of the freased baseline level up to 2015 would be:

3.2.1. Policy and non-investment activities

Legislative acts and Policy:
- Establish and put in place the Legislative Framework for phase-out of HCFCs and equipment containing HCFCs at State and Entities' levels:
- Import quotas, permits, price control and import taxes on imported HCFCs and equipment containing HCFCs,
- Plan for baning import of equipment containing or using refrigerants HCFCs or blended HCFCs;
- Improving of reporting system (annual reporting of HCFCs importers/exporters, distributors and consummers)

Training activities:
- Training workshops for custom officers, custom clearance and meritime agences and importers of HCFCs';
- Training workshops for service technicians and mechanics;

Awareness raising:
- Promotion activities-workshops for and introduction of new non-HCFC technologies in refrigeration sector,
- Establisment and support of activities of a Refrigeration & Air-condition Assiciation,
- Technical seminars and workshops
- Establish Code of Good Practice in Refrigeration and Air–condition Sectors
- Promotion activities on Radio, TV and written media
- Establishment of NOU Web site and follow the implementation of the HPMP

3.2.2. Conversion investment projects

- Preparation and implementation of selected priority investment HCFC conversion projects for phase-out of HCFC-141b and HCFC-22 in manufactoring industries (rigid PU foam and commercial refrigeration appliences);

- Preparation and implementation of a selected "Retrofitting and chillers replacement pilot project for HCFC conversion", which may be the project for HCFC-22 phase-out in a group of existed water chillers facilities installed and operating in medical organisations (medical centres and hospitals) which use R-22 as refrigerant

3.3. Selection of priority areas of policy and conversion interventions for the implementation of HPMP Stage 2

3.3.1. Policy and non-investment activities

Training activities and certifications:
- Training workshops for custom officers, custom clearance and meritime agences and importers of HCFCs' on newly established HCFC phase-out legislative acts and operational measures;
- Support of education and training activities in vocational scools and at the universities on introduction of upgrated non-HCFC refrigeration technollogies and using of natural refrigerants;
- Certification of refrigeration service technicians and mechanics;
- Certification of refrigeration service workshops

Awareness raising:
- Promotion seminars for HCFCs end users;
- Publish brochures and pamphlets;
- Promotion activities on Radio, TV and written media

3.3.2. Other interventions and legislative measures:

- Set-up a regulations for re-usable refrigerant cylinders;
- Ban of import of equipment containing HCFCs;
- Ban of import non-refillable HCFCs refrigerant containers
- Development of Recovering / Recycling schema

4. STRATEGY AND PLAN FOR THE IMPLEMENTATION OF HCFC PHASE-OUT

4.1. Overall strategy and HCFC Phase-out Plans

The overall HCFC Phase-out Strategy of Bosnia and Herzegovina, Plan of action and Phase-out activities required to meet the phase-out targets:

- to freeze HCFCs consumption -Base Line level on 2013;
- to meet 2015 phase-out targets and
- phase-out of HCFC consumption (excluding up to 5 % for servicing purposes) up-to 2020
- total (100%) phase-out of HCFC consumption up-to 2030

is based on the General Strategy for HCFCs Phase-out, defined in the above sub-chapter 3.1.2. – HCFC Phase-out Programme for Bosnia and Herzegovina.

To meet this challenged schedule it would be necessary to follow national plan of gradual reduction of HCFC consumption in accordance with the schedule shown on the Table 25 billow.

Table 25: HCFC consumption reduction and phase-out schedule

Base Line / Action for reduction	***Total amount of HCFCs (M tone)***	***Total remains for phase-out***	***Reduction up to year***
Base Line – Average consumption 2009-2010	**87.7**		
Freeze at Base Line level	87.7	87.7	2013
30 % reduction	26.3	61.4	2015
40 % reduction	35.1	52.6	2016
70 % reduction	61.4	26.3	2018
95 % reduction	83.3	4.4	2020
100 % reduction	87.7	0	2030

4.1.1. National policy measures and instruments for HCFC phase-out

The following non-investment activities which will enable Bosnia and Herzegovina to meet the achievement of planned targets for HCFCs phase-out will be:

Policy measures:
- Establish and put in place the HCFC regulations on import quota and permits and limit annual import of HCFCs and equipment containing HCFCs;
- HCFCs distribution price control at BiH market;
- Ban of import HCFCs and equipment containing HCFCs

Policy instruments:

- Put in place a HCFC Plan for phase-out and regulations on import quotas and permits for import of HCFCs and equipment containing or using HCFC substances and strengthen the monitoring of the regulations implementation;
- Limitation of import of new HCFC containing equipment –national annual import quota for each year adjust with the Plan for gradually reduction of import of HCFC containing equipment. Prepare and adopt (on national level) a Plan for limitation of the import of HCFC containing equipment (for the period 2013-2015) up to the middle of 2012 and start with its implementation beginning the 2013;
- Establish a price control through the introducing of a new - increased import taxes on HCFCs and HCFC containing equipment, applied in Stage 1 of the HPMP implementation;
- Plan and schedule for limit and gradually reduction of import of new air-conditioning equipment containing HCFC refrigerant and ban of import of second-hand / used HCFCs containing equipment and new HCFC-based refrigeration and air-conditioning installations, based on the Plan for HCFCs gradually reduction (Stage 1) and phase-out (Stage 2) of the HPMP implementation.

Unfortunately, due to a very complex present constitutional and institutional structures in Bosnia and Herzegovina, and the facts that the all-over Environmental Policy is on the Entities' level, and that does not exist any national environmental policy, except environmental international relations and implementation of international environmental agreements that are delegated to the state level, it is impossible for the time being to introduce any additional "environmental taxes" except a regular import tax for goods imported to Bosnia and Herzegovina from non-EU and non-CEFTA countries.

4.1.2. HCFC conversion investment projects:

Preparation and implementation of the priority selected investment conversion projects in Foam and Refrigeration sectors till 2015, will enable Bosnia and Herzegovina to meet its planned commitments for phase-out more than 30% of its HCFC consumption Base-line.

Those selected projects are:

- **Investment project for conversion of blowing agent HCFC-141b to eligible non-HCFC technology in the manufacturing company "ALTERNATIVA" Hrasnica Sarajevo,** which produce rigid- polyurethane foam insulation panels, modular PU rigid foam and pre-blended Polyol.

Implementation of this project will enable to phase-out **23 Metric tons (2.53 ODP tones)** of **HCFC-141b**;

- **"UMBRELLA" Investment project for conversion of blowing agent HCFC-141b to eligible non-HCFC technology and refrigerant HCFC-22 to HFC blends or natural refrigerants in 6 small and medium size refrigeration manufacturing enterprises**:
  - „ORDAGIC", Srabrenik;
  - „SOKO-RKT", Mostar";
  - „KUCA LEDA", Mostar";
  - „EKO FRIGO", Banja Luka";
  - „ELEKTRO FRIGO" Banja Luka and
  - „FRIGOKLIMA" Banja Luka

It is necessary to stress, that HCFC-141b blowing agent, used in production of insulated polyurethane rigid foam is consumed by these companies in purchased pre-blended Polyol (pre-mixed Polyol system)
Implementation of this project will enable to phase-out about 15.00 Metric tonnes (0.83 ODP tones) of HCFC-22 and about 6 Metric tonnes (0.66 ODP tones) of HCFC-141b;

- **Retrofitting and chillers replacement pilot project for HCFC-22 conversion in the group of water-cooling chillers installed in 6 public medical institutions**.

By the implementation of this project will be saved about 2.3 M tone of the installed refrigerant R-22 and not to be released into the athmosphere, due to very old chillers' installations, and recovered refrigerant will be recycled.

4.1.3. Plan for gradually reduction of HCFC consumption (Stage 1 of the HPMP implementation)

The activities of all stakeholders in Bosnia and Herzegovina who may contribute to gradually reduction of HCFCs consumption during the Stage 1 of the HPMP implementation and measures which will be taken in this regard are as follows:
- Completion of the selected investment projects for conversion of HCFC-used technologies to non-HCFC alternatives in manufacturing sector (production of rigid foam and production of refrigeration commercial appliances);
- Ban of import of equipment containing or using HCFCs (target: ban of import of air-conditioning equipment), during the Stage / Phase 1 of the planned gradual consumption reduction of HCFCs (period 2013-2015) and reduce needs for HCFCs import (target: HCFC-22 refrigerant for servicing of installed air-condition equipment);
- Decreasing of needs for HCFCs' import in refrigeration and air-conditioning servicing sector through the establishment of Annual Import Quota System and gradually reduction of allowed total import of R-22 and air-condition equipment (unitary and split types) containing refrigerant R-22 in the period 2013-2015;
- Raising awareness and control measures (for import of HCFC refrigerants-targeting R-22 and equipment containing R-22), with active participation of all the most important national stakeholders such as: NOU-Ministry of Foreign Trade and Economic Relations, Entities' Ministries of Environment and Trade, Government of the District Brcko BiH, National Custom Authority and Association of Refrigeration and Air-condition Manufacturing and Servicing Organizations, as well as licensed Importers and Distributors of these goods at BiH Market.
The starting point for the gradual limitation of the total import quotas (for R-22 in kg) and for equipment containing HCFCs (number of units), starting from 2013 will be a Base line (average import 2009-2010) of import of these goods.
The Ministry of Foreign Trade and Economic Relations in close cooperation with the two Entities' Ministries of Environment and the Government of District Brcko will establish an Import-Quota Plan for annual quota reduction. The Plan will be the integral part of this HPMP.

In the Table 26 billow are shown all planned activities and actions in Bosnia and Herzegovina for the implementation of the **HPMP-Stage 1** and key national stakeholders - authorities and institutions and NGOs which will participate in its implementation, as well as a plan for gradually reduction of HCFCs consumption.

Table 26: Plan of activities for the implementation of HPMP –Stage 1 and reduction of HCFCs

Activity/Project	***Scheduled completion term / put in place***	***Key stakeholders***	***HCFC reduction (Mt /ODP t)***
STAGE 1 (2012-2015)			
Policy and non-investment activities			
Legislative acts and Policy			
Legislative Framework for phase-out of HCFCs consumption and import of equipment containing HCFCs	December 2012	►NOU-MoFTER; ►Entities' Ministries of Environment	
Plan for gradual reduction of import of HCFCs and HCFC equipment for the period 2013-2015	June 2012	►NOU-MoFTER	
Import quotas & permits for HCFCs and equipment containing HCFCs	September 2012	►NOU-MoFTER ►Custom Authority	
Price control – increasing of import taxes on HCFCs and equipment containing HCFCs	January 2013	►NOU-MoFTER ►Custom Authority	
Improving of reporting system inland country	Up to December 2012	►Importers/exporters, Custom Authority; Distributors and End-consummers of HCFCs	
Training activities and certifications:			
Project: Training workshops for custom officers, custom clearance and meritime agences & importers	January-February 2012	►NOU-MoFTER ►Custom Authority	
Project: Training workshops and certifiction for service technicians and mechanics	March 2012-May 2013	►NOU and BiH Training Centers	
Awareness raising:			
Promotion activities-seminars	2012-2015	►NOU	
Establisment and support of activities of a Refrigeration & Air-condition Assiciation (RAA)	2012-2013	►Refrigeration producers and services with assistance of NOU and BiH Foreign Chamber	
Technical seminars and workshops	2012-2013	►NOU	
Establish Code of Good Practice in Refrigeration and Air–condition Sectors	December 2013	►NOU-MoFTER	
Promotion activities on Radio, TV and written media	2012-2015	►NOU	
Establishment of NOU Web site	January 2012	►NOU with assistance of UNIDO	
Conversion investment projects			
Project: Conversion of HCFC-141b to non-HCFC technology in the foam	December 2013	►Technical assistance: UNIDO	**23 / 2.53**

manufacturing company "ALTERNATIVA" Hrasnica Sarajevo.		►National Implementation Agency: NOU-MoFTER	
Project: "UMBRELLA" project for conversion of R-141b and R-22 in 6 refrigeration manufactories – SMEs	December 2014	►Technical assistance: UNIDO ►National Implementation Agency: NOU-MoFTER	**21 / 1.47**
Project: Retrofitting and chillers' replacement pilot project for HCFC-22 conversion in water-chillers installations in 8 medical institutions.	December 2015	►Technical assistance: UNIDO ►National Implementation Agency: NOU-MoFTER	**2.3 / 1.27**
TOTAL HCFC phase-out	(up-to December 2015)		**46.3 / 5.27 (82% of the Base-Line**

4.1.4. Plan for phase-out of HCFCs consumption (Stage 2 of the HPMP implementation)

In the billow Table 26 are shown frame planned activities in Bosnia and Herzegovina for the implementation of Stage 2 of the HPMP for full phase-out of HCFCs import / consumption of these virgin substances in the country.

This plan shows that during the period 2016-2040 will not be any activities for conversion interventions – nor implementation of any HCFC investment conversion project.

All activities, mostly delegated to the National Ozone Unit (NOU) of Bosnia and Herzegovina will be focused non-investment activities, such as: updating of training activities, coordination of certification process for refrigeration and air-conditioning service technicians and mechanics and service workshops, as well as on different activities in establishing or / and updating of legislative acts and measures on state and entities' levels which will strengthen the implementation of the HPMP and the Montreal protocol as well.

An awareness raising and promotion activities will also take a significant portion in the implementation of the HPMP's activities during this period.

Table 27: Frame Plan of activities for the implementation of HPMP –Stage 2 and phase-out of HCFCs

STAGE 2 (2016-2030)			
Activity/Project	***Scheduled completion term / put in place***	***Key stakeholders***	***HCFC reduction / phase-out (Mt /ODP t)***
Policy and non-investment activities			
Trainings, Education and Certifications			
Project: Training workshops for custom officers, custom clearance and meritime agences & importers	January 2016	►NOU-MoFTER ►Custom Authority	
Support of education and training activities in vocational scools and at the universities	2016-2020	►NOU-MoFTER ►Entities' Ministries of Education	
Project: Training workshops and certification of refrigeration service technicians and mechanics	2016-2017	►NOU and BiH Refrigeration Training Centers	
Project: Certification of refrigeration service workshops	2016-2017	►BiH Refrigeration Training Centers	
Awareness raising			
Promotion seminars for HCFCs end users	2018	►NOU	
Publishing brochures and pamphlets	2019-2020	►NOU	
Promotion activities on Radio, TV and written media	2016-2030	►NOU	
Other interventions and legislative measures			
Set-up a regulations for re-usable refrigerant cylinders	Up-to: June 2016	►NOU-MoFTER	
Ban of import of equipment containing HCFCs	Up-to: January 2016	►MoFTER ►Custom Authority	
Ban of import non-refillable HCFCs containers	Up-to: January 2017	►MoFTER ►Custom Authority	
Development of Recovering / Recycling schema	2016-2017	►NOU with technical assistance of UNIDO	
Phase-out and ban of import of HCFCs	**From January 2031**	►MoFTER ►Custom Authority	**100% of the Base Line (6.32 ODP t)**

4.2. Project coordination and monitoring

Bosnia and Herzegovina has the successful experience in coordination and management of the implementation of the Montreal Protocol and programmes, implemented through the approved Country Programme for ODSs Phase-out and the NOPP-and projects for Ozone Layer protection.

The National Ozone Unit (NOU BiH)) is the key national body established within the Ministry of Foreign Trade and Economic Relations (MoFTER), which is responsible for all over coordination of the activities at state and entities' levels for facilitation of ODS phase-out and implementation of by the Multilateral Fund funding projects and other activities.

The NOU BiH in cooperation with UNIDO-Multilateral Agreements Branch is managing all activities and represents the Government of Bosnia and Herzegovina since 1999 in the implementation of the country's commitments for the protection of the Ozone Layer and the Montreal Protocol implementation.

So, it is expecting that the State Government (Council of Ministers), with the acceptance of the both Entities (Federation BiH and Republika Srpska) will delegate the implementation of the HPMP to the NOU-MoFTER.

The management of the implementation of the HPMP planned activities will be allocated to the NOU in cooperation with UNIDO as an International Implementing Agency.

The main stakeholders in Bosnia and Herzegovina, besides NOU, which will be involved in the implementation of the HPMP are:

- Ministry of Foreign Trade and Economic Relations (as the National Focal Point for the implementation of the Vienna Convention and the Montreal Protocol);
- Both Entities' Ministries of Environment;
- Government of the District Brcko BiH;
- State Custom Authority;
- ODS (HCFC) and HCFC containing equipment importers and distributors to BiH Market;
- Manufacturing companies and service shops in refrigeration and air-conditioning sector;
- Local end users of HCFCs.

UNIDO was delegated and authorized as the International Implementation Agency for monitoring of the HPMP implementation and this agency is also responsible for financial the management of the approved financial assistance received from the Multilateral Fund.

4.3. Reports and verification

National Ozone Unit of Bosnia and Herzegovina (NOU BiH) is authorized in full capacities, for preparing and sending on behalf of Bosnia and Herzegovina, all annual or occasional reports to the MLF Secretariat or to the ExCom on the HPMP implementation progress, agreed and approved plans, programmes, activities and projects.

NOU will-Ministry of Foreign Trade and Economic Relations will submit, trough the UNIDO, to the Multilateral Fund Secretariat annual Progress Reports of a status of the HPMP implementation, with the copies to both Entities' Ministries of Environment and to the Government of District Brcko.

The above mentioned reports will be prepared on the truly information collected and reports received from the main domestic stakeholders responsible for implementation of the HPMP, such as: National Custom Authority, Importers and Distributors of HCFCs; End-users in manufacturing and service sub-sectors, Beneficiaries of the approved and implementing

investment conversion projects and other stake holders who may be involved in the HPMP implementation

The NOU is responsible to coordinate in cooperation with UNIDO the preparation and implementation of all particular projects, and report to the Multilateral Fund, through the UNIDO on the status of their implementation.

Monitoring of HPMP development and verification of the achievement of the performance targets, specified in the Plan, will be assigned to independent local company/consultants. Annual report of Monitoring and Verification Audit will be submitted to the NOU and UNIDO.

5. COST CALCULATIONS OF THE HPMP IMPLEMENTATION AND HCFC PHASE-OUT IN BOSNIA AND HERZEGOVINA

The cost of the planned activities and projects implementation expenses are estimated on the basis of previously implemented Country Programme and National ODS Phase-out Plan (NOPP) and information collected from some producers of non-HCFC technology production equipment.

It is necessary to emphasize, that in these Costs calculations were taken in to consideration all requirements and relevant Decisions related to funding the phase-out of HCFC consumption in the Article 5 countries that were adopted by the Executive Committee of the Multilateral Fund and the requirements of the "**GUIDE FOR THE PREPARATION OF HCFC PHASE-OUT MANAGEMENT PLANS" issued by the Secretariat of the Multilateral Fund in July 2010.**

Appendix 1: Investment projects cost

5.1. Projects' investment costs calculation

5.1.1. Project 1: HCFC conversion project in Foam manufacturing industry" Alternativa" Conversion technology purpose: HCFC-141b to be converted to n-Pentane blowing agent

Table 28: Technical Specifications and estimated cost for the equipment supply and construction works of the Project

Item	*Description of foaming equipment, accessories and other services to be supplied by international and local contractors*	*Estimated cost to be covered by the MLF support (US$)*	*Investment facilities to be provided by Counterpart*
Foaming equipment and installations	High pressure Foaming machine, output capacity min. 60 kg-max. 120 kg/ min; Components blended Polyol with n-Pentane: to Isocyanate, ratio-1:1, self-cleaning mixing head	135,000	
	Pre-mixing unit with self ventilation system, Poyol and Isocianate pre-mixing storage tanks, size 250 l each with necessary air pressure gauges, including automatic filling pumps and other accessories	40,000	
	Metering and pouring unit	20,000	
	Hydraulic unit with temperature controlled chiller unit	25,000	
	Nitrogen generator with accessories	20,000	
	Control panel with programmable controller and main switch	10,000	
	Installation of foaming equipment, piping and accessories	25,000	
n-Pentane storage and supply system	n-Pentane storage tank of capacity 12 m^3		YES
	Low-pressure system and n-Pentane tank accessories and fittings	5,000	
	n-Pentane delivery pumps, safety and control instruments and operating accessories	20,000	
	n-Pentan storage area porch, steel structure, protected fence, water pool and other related civil construction works		YES
	Fixed fire-fighting facility including extinguishing water sprinkler batteries		YES
	Earthing of storage structure and equipment		YES
	Alternative water supply – tank and installation		YES
	Alternative el. power supply-Diesel electric generator		YES
Safety operating system	Ventilation system in the foam production area, including supply and installation of fans and ventilation exhaust system	50,000	
	Safety installations, n-Pentan detection, alarm, control and other electric devices	15,000	
	Antistatic floor in the Foam Plant		YES
Energy supply and installations	El. energy power, water and high pressure air supply and installations to Foam Plant and n-Pentane storage area		YES
Technical documentation, technology transfer and training	Technical and engineering documentation of foaming equipment, n-Pentane storage, piping, and accessories, detailed technology scheme, drawings of foam equipment, and other facilities, safety concept and installations	30,000	
	Technology transfer, commissioning and start-up of the foaming plant and on-job operators training		
Safety certification	Operating safety certification and Industrial standards applied in production of Foam Plant equipment verification	10,000	
Redesign interventions	Redesign of moulding tools and start-up materials	20,000	
	TOTAL ESTIMATED COST	**425,000**	**90,000**

5.1.2. HCFC conversion project in Refrigeration manufacturing industry "Umbrella project for for 6 SMEs"

Conversion technology purpose: **HCFC-141b** to be converted to **CO_2 (water) blowing agent** and **refrigerant HCFC-22** to **HFC-134a and HFCs blends**

Table 29: Technical Specifications and estimated cost for the equipment supply and oter services of the Project

Item	*Description of foaming equipment, accessories and other services to be supplied by international and local contractors*	*Number of units / sets*	*Estimated unit price (US$)*	*Estimated cost to be covered by the MLF support (US$)*
1	General foaming machine, capacity of foam pouring: 30-40 kg/min with premixing unit, control panel with programmable foam pouring controller and accessories	2	50,000	100,000
2	Spray foaming machine, capacity of foam pouring: 25-30 kg/min		40,000	40,000
3	Mobile multifunctional automatic unit for recovery, evacuation and charging, operating with HFC-134a and HFC blends refrigerants (unit on weels)	6	5,000	30,000
4	Hand set of recovery & charging machine for refrigerants HFC-134a and HFC blends refrigerants	6	1,500	9,000
5	Vacuum pump	12	500	6,000
6	Set of valves and hoses, suitable for HFC-134a and HFC blends	24	300	7,200
7	Electronic balance (weighing machine)	6	500	3,000
8	Recovery cylinders for HFCs and blends	18	50	900
9	Digital vacuum gauge	6	400	2,400
10	Refrigerants electronic identifications (to identify HCFCs, HFCs and HFC blends)	6	1,500	9,000
11	Electronic leakage detector	12	500	6,000
12	Electronic balance (weighing machine)	6	300	1,800
13	Redesign of moulding tools and start-up materials	lumpsum		60,000
14	Transport of equipment to site location, assembling, commissioning, technology transfer and on-job training	lumpsum		60,000
	TOTAL ESTIMATED COST			**335,300**

5.1.3. Retrofitting and chillers replacement pilot project for HCFC-22 conversion in water-chillers installations in 7 public medical institutions.

The cost of water-chillers and / or chillers' equipment replacement or / and retrofitting for use of HFC or HFC blend refrigerants installed in 6 BiH public medical institutions is a frame estimatation, and the realy calculated cost would be possible to do after detailed surveying of installer chillers installation only.

Appendix 2:

ESTIMATED COST OF THE HPMP-STAGE 1 IMPLEMENTATION

HPMP-Stage 1 (2012-2015)

Table 28: Estimation of the cost for the implementation of the HPMP-Stage 1

Activity/ Project	*Proposed period for implementation*	*Estimated Cost (US$)*
HCFC-phase-out investment projects and conversion interventions		
Preparation of three investment conversion projects in Foam and Refrigeration sectors	July 2011-March 2012	[1] **80,000**
Project 1: Conversion of HCFC-141b to non-HCFC technology (using n-pentane as blowing agent) in the foam manufacturing industry "ALTERNATIVA" Hrasnica, Sarajevo	January 2012-December 2013	**425,000**
Project 2: "UMBRELLA" project for conversion of R-141b to CO_2 (water) blowing agent and R-22 to HFC blends in 6 SMS refrigeration manufactories	June 2012-December 2014	**335,300**
Project 3: Retrofitting and chillers replacement pilot project for HCFC-22 conversion in water-chillers installations in 7 public medical institutions.	January 2013-December 2015	**320,000**
Total Investment projects		***1,160,300***
Policy and Legislation		
Establishment Legislative Acts and HCFC Phase-out Policy	January 2012-December 2012	10,000
Sub-total Policy and Legislation		***10,000***
Training activities and certifications		
Project: Training workshops for custom officers, custom clearance and meritime agences & HCFC importers	January-February 2012	30,000
Project: Training workshops and certifiction for service technicians and mechanics	March 2012-May 2013	60,000 (40)
Sub-total Trainings		***90,000***
Awareness raising		
Promotion activities-seminars	2012-2015	
Establisment and support of activities of a Refrigeration & Air-condition Assiciation (RAA)	2012-2013	
Technical seminars and workshops	2012-2013	
Establish Code of Good Practice in Refrigeration and Air–condition Sectors	December 2013	
Promotion activities on Radio, TV and written media	2012-2015	
Establishment of NOU Web site	January 2012	10
Sub-total Awareness raising		***Lump sum: 60,000***
Total non-investment activities		**160,000**
GRAND TOTAL Stage 1		**1,320,300**

NOTE: [1] *In this amount are included already allocated funds of US$ 30,000 approved by the ExCom for Bosnia and Herzegovina for the preparation of the foam conversion investment project (Decision 63/18 of the 63rd ExCom Meeting)*

Appendix 3:

ESTIMATED COST OF THE HPMP-STAGE 2 IMPLEMENTATION

HPMP-Stage 2 (2016-2030)

Table 29: Frame estimation of the cost for the implementation of the HPMP-Stage 2

Activity/ Project	*Proposed period for implementation*	*Estimated Cost (US$)*
Policy and non-investment activities		
Trainings, Education and Certifications		
Project: Training workshops for custom officers, custom clearance and meritime agences & importers	January 2016	30,000
Project: Training workshops and certification of refrigeration service technicians and mechanics	2016-2017	50,000
Project: Certification of refrigeration service workshops	2016-2017	20,000
Support of education and training activities in vocational scools and at the universities	2016-2020	30,000
Sub-total for Trainings & Certifications		***130,000***
Awareness raising		
Promotion seminars for HCFCs end users	2018	
Publishing brochures and pamphlets	2019-2020	
Promotion activities on Radio, TV and written media	2016-2030	
Sub-total for Awareness raising		***30,000***
Other interventions and Legislative measures		
Set-up a regulations for re-usable refrigerant cylinders	Up-to: June 2016	
Ban of import of equipment containing HCFCs	Up-to: January 2016	
Ban of import non-refillable HCFCs containers	Up-to: January 2017	
Sub-total Other interventions and measures		***10,000***
***Project*: Development of Recovering / Recycling schema**	2016-2017	160,000
Sub-total Recovering / Recycling schema		***260,000***
GRAND TOTAL Stage 2		**430,000**

Appendix 3:

SUMMARY OF ESTIMATED COST FOR THE IMPLEMENTATION OF Stage 1 AND Stage 2 OF THE HPMP OF BOSNIA AND HERZEGOVINA

and

FRAMEWORK PLAN FOR ANNUAL FUNDINGS OF THE IMPLEMENTATION ACTIVITIES –FOR OF THE HPMP - Stage 1

Table 30: Estimated Cost of the HPMP implementation

HPMP-Stage	Estimated Cost (US$)	Period of implementation
Stage 1	**1,320,300**	**2012-2015**
Stage 2	**430,000**	**2016-2030**
GRAND TOTAL	**1,750,300**	**2015-2030**

Table 31: Estimated Cost by years for funding of the implementation of the HPMP –Stage 1

Year	*Total Cost for funding (US$)*	*Investment Capital and Operational Cost (US$)*	*Operational non-Investment Cost (US$)*
2011	**30,000**	30,000	
2012	**485,000**	405,000	80,000
2013	**405,000**	370,000	35,000
2014	**250,000**	220,000	30,000
2015	**150,300**	135,300	15,000
Total	**1,320,300**	**1,160,300**	**160,000**