

TBBPA

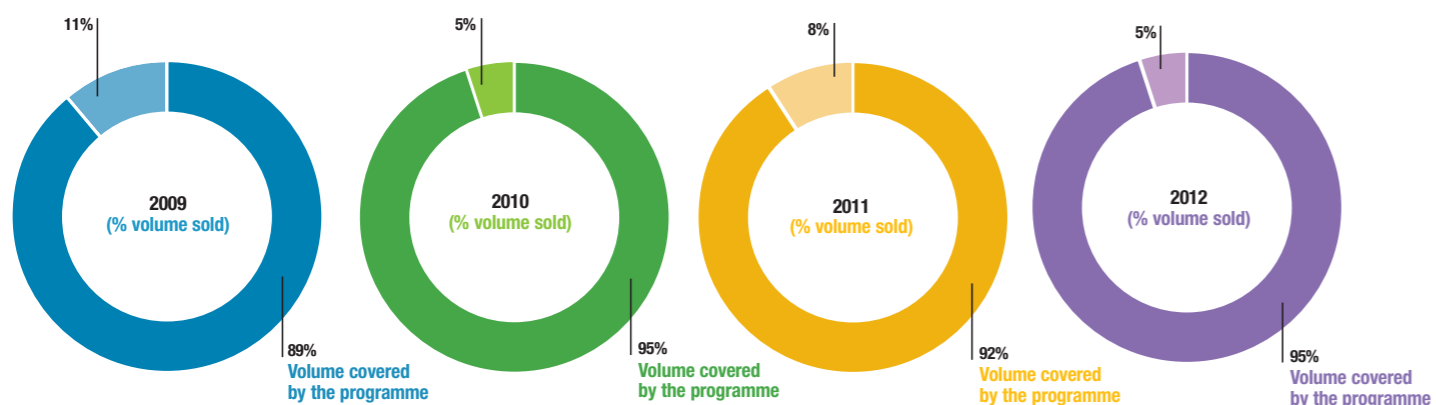
TBBPA is a flame retardant used mainly in electrical and electronic equipment. It is used in flame retardant-4 printed circuit boards.

FIGURE 11: TBBPA 2012 survey results

Survey year	2008	2009	2010	2011	2012
2011 Total Volume Sold (metric tonnes per year)	2500-5000	2500-5000	1000-2500	1000-2500	1000-2500
Total Potential Emissions (metric tonnes per year)	< 1	< 0.25	< 0.50	< 0.005	< 0.003

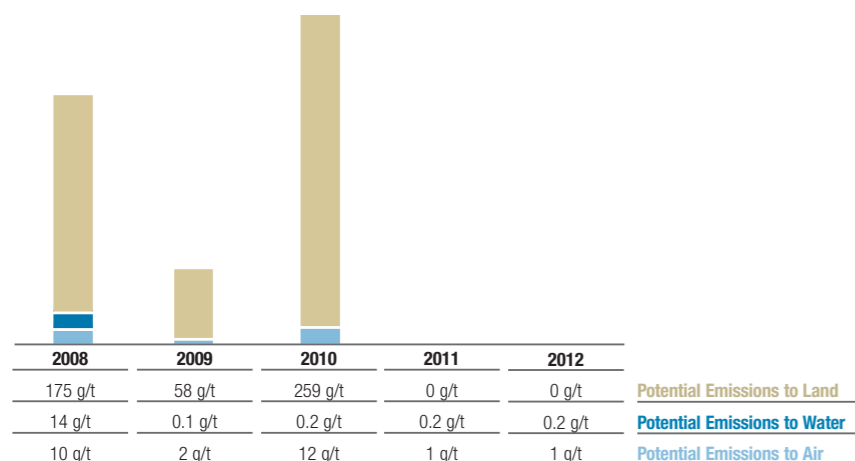
- Total potential emissions dropped below 0.003 metric tonnes per year

FIGURE 12: Percentage of volume covered by the programme



- Participation rate increased to 95% of the volume covered by the programme

FIGURE 13: Comparative TBBPA survey results (2008-2012) by emission type (g/t)



- Potential emissions to air and land have been maintained at the lowest possible level
- Continued reporting of zero potential emissions to land

HOW THE PROGRAMME WORKS

CERTIFICATION

Certification is the process by which audits are carried out by independent auditors. This is undertaken by an independent third party (Bureau Veritas) and is based on ISO 9001/14001 principles. VECAP now has eleven certified sites worldwide. Five of these are in Europe as well as three production sites in the US, two in the Middle East (Israel and Jordan) and one in China.

VISION FOR THE FUTURE

The VECAP methodology is applicable to a wide range of substances beyond potential emissions of flame retardants. The survey tools will be simplified and generalized in order to be applied to any type of product. The programme is also being actively promoted in the Asia Pacific region. The extension of the scheme globally demonstrates how the willingness of industry to take responsibility for environmental concerns.

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VECAP

The Voluntary
Emissions
Control Action
Programme



MAINTAINING MOMENTUM

Summary 2012 VECAP European Annual Progress Report

The Voluntary Emissions Control Action Program¹ (VECAP) is a pioneering environmental management tool championed by the three main producers of flame retardants², to ensure a better management of chemicals throughout the value chain from producers to downstream users. This product stewardship initiative operates under the principles of Responsible Care®, the chemical industry's commitment to the safe and environmentally sound management of chemicals worldwide.

In Europe, the programme has been run by the European Flame Retardant Association³ (EFRA), a sector group of the European Chemical Industry Council⁴ (CEFIC), since 2004. The scheme was extended to North America in 2006 where it operates under the North American Flame Retardants Association⁵ (NAFRA), a sector group of the American Chemistry Council⁶ (ACC). Opportunities to roll out the programme are currently being developed in the Asia Pacific region.

HOW DOES VECAP WORK?

VECAP aims to reduce potential emissions of the flame retardants Decabromodiphenyl ether (Deca-BDE), Hexabromocyclododecane (HBCD) and Tetrabromobisphenol A (TBBPA) during the manufacturing stage by raising awareness of

responsible chemicals management among those involved in the process and by promoting environmental best practices throughout the value chain. In 2013 members will also include Ethane Bis Pentabromophenyl (EBP) under the programme.

While VECAP can use real measurements, the majority of the participating companies don't have measured data and surveys use estimated potential emissions based on their practices. Calculations of estimated potential emissions are based on a precautionary approach rooted in typical average values whereby the chemical substance being controlled is assumed to be emitted unless user and producer processes and practices can account for that emission being prevented.

PROMOTING BEST PRACTICES

VECAP helps companies implement recommendations for best practices by encouraging users to adopt the Industry's Code of Good Practice. As an annex to this Code, Best Available Technique guidance documents have been developed for emptying bags containing polymer additives and intermediate bulk containers efficiently.

Implementation of this voluntary programme demonstrates the proactive involvement of companies, many of whom are small and medium-sized enterprises (SMEs), to adopt practices both for reasons of environmental best practice and economic efficiency.

2012 SURVEY RESULTS

The 2012 European survey results shows a substantial reduction in total potential emissions for the three flame retardants, over the last 5 years, demonstrating that the scheme is successful in raising awareness among all users in the value chain to implement best practices and follow the recommended Code of Good Practice. More notably, potential emissions to air and water of the flame retardant TBBPA have been maintained at the lowest possible levels while potential emissions to land remain at zero. Overall participation in the programme remained high at covered 93% of total volume sold by EFRA member companies. In 2012, Everkem⁷, joined the programme and from 2013, surveys will be done by 4 companies which will increase the programme coverage in Europe.

Results for the 2012 European annual progress report are based on coverage of the volume sold by EFRA member companies in 2011.

¹ VECAP: www.vecap.info

² Albemarle, Chemtura, ICL-IP: www.albemarle.com, www.greatlakes.com, www.icl-ip.com

³ EFRA: www.cefic-efra.com

⁴ CEFIC: www.cefic.org

⁵ NAFRA: <http://flameretardants.americanchemistry.com/About-Us>
www.americanchemistry.com/

⁶ ACC: www.americanchemistry.com

⁷ Everkem: www.everkem.it

DECA-BDE

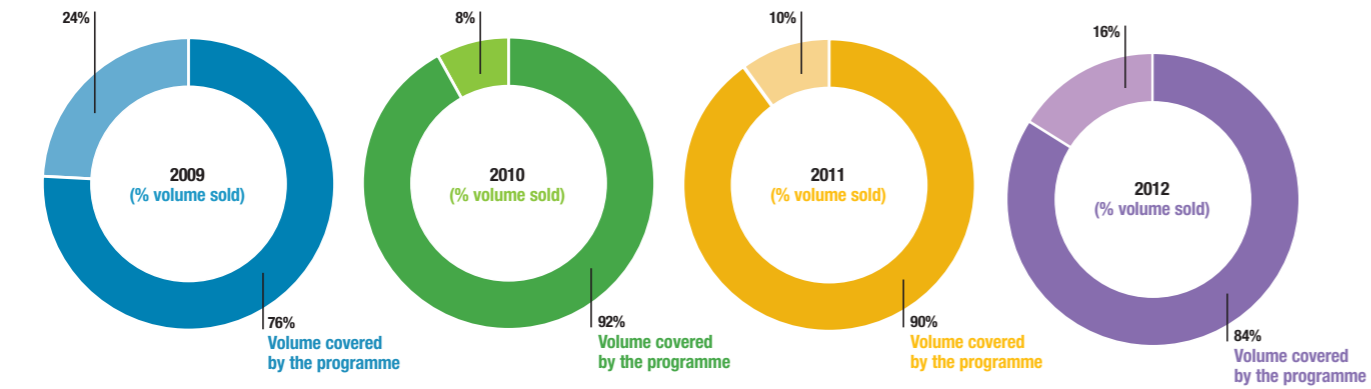
Deca-BDE is a flame retardant used in textiles, in the transportation sector (automotive and aviation industries) and in construction and building (e.g wires, cables and pipes).

FIGURE 1: Deca-BDE 2012 survey results

Survey year	2008	2009	2010	2011	2012
2011 Total Volume Sold (metric tonnes per year)	5000-7500	5000-7500	5000-7500	7500-10000	2500-5000
Total Potential Emissions (metric tonnes per year)	< 4	< 1.5	< 1.5	< 0.5	< 0.3

• The total potential emissions were less than 0.3 metric tonnes per year

FIGURE 2: Percentage of volume covered by the programme



- Participation rate at remained high at 84% of the volume covered by the programme
- The minor drop in the participation rate due to new users not yet familiar with the programme joining the programme

FIGURE 3: Comparative Deca-BDE survey results (2008-2012) by emission type (g/t)

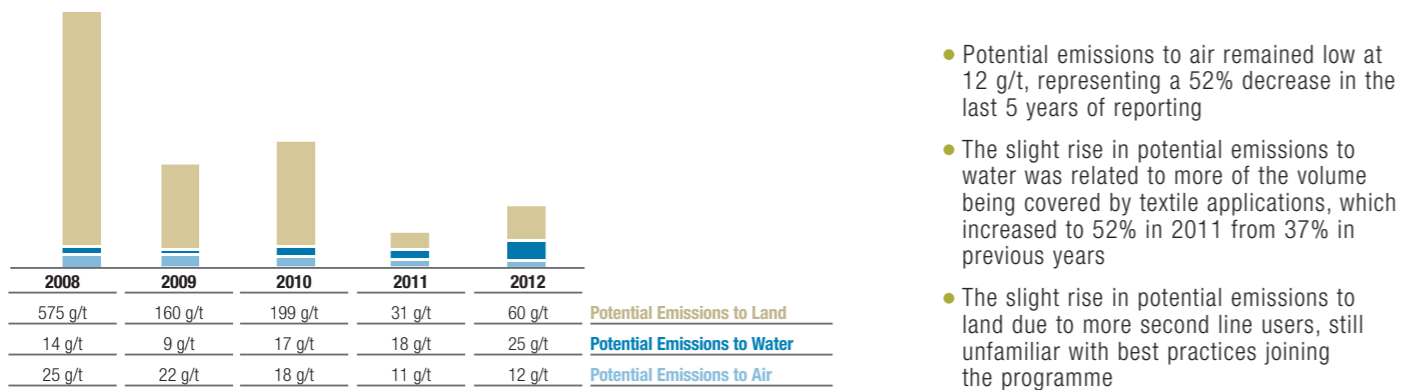


FIGURE 4: Deca-BDE potential land emissions from packaging waste residues

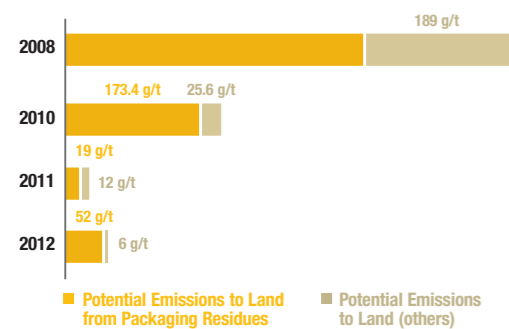
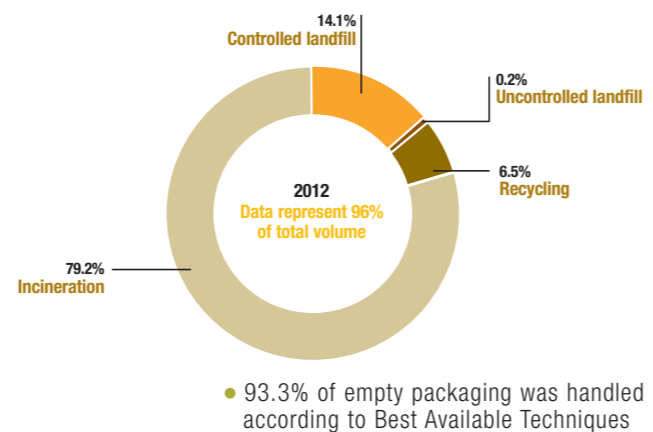


FIGURE 5: Survey 2012 (volume 2011) destination of Deca-BDE packaging



HBCD

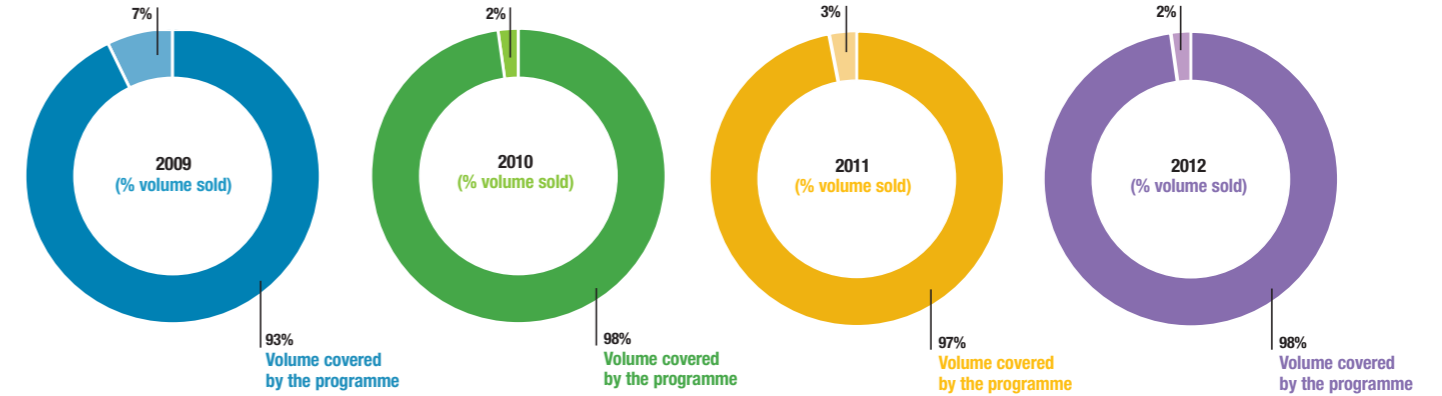
HBCD is a flame retardant used in thermal insulation foams. Its main application is in expanded and extruded polystyrene (EPS and XPS) insulation foam boards employed by the construction sector and it is also used in electrical boxes (HIPS) and textiles.

FIGURE 6: HBCD 2012 survey results

Survey year	2008	2009	2010	2011	2012
2011 Total Volume Sold (metric tonnes per year)	10000-12500	7500-10000	7500-10000	10000-12500	10000-12500
Total Potential Emissions (metric tonnes per year)	< 2.5	< 0.5	< 0.6	< 0.5	< 0.25

• Total potential emissions were below 0.25 metric tonnes per year, representing a 50% reduction compared to the previous year

FIGURE 7: Percentage of volume covered by the programme



- Participation rate increased to 98% of the volume covered by the programme

FIGURE 8: Comparative HBCD survey results (2008-2012) by emission type (g/t)

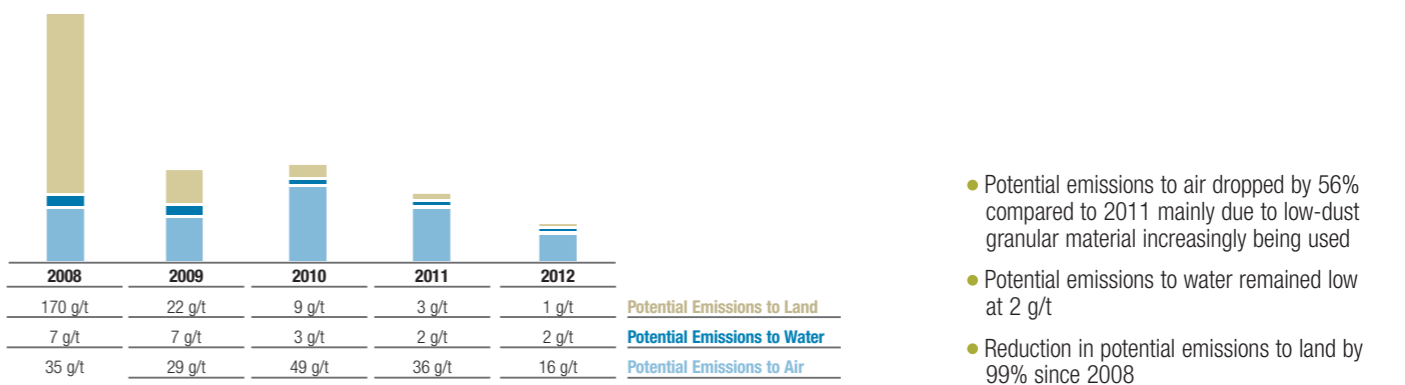


FIGURE 9: HBCD potential land emissions from packaging waste residues

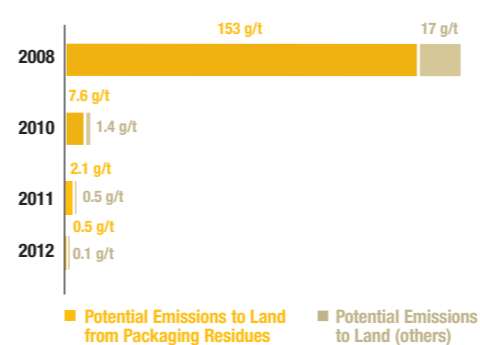


FIGURE 10: Survey 2012 (volume 2011) destination of HBCD packaging

