Polybrominated Diphenyl Ethers (PBDEs) in Plastics

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Article 14 of Basel Convention: The Parties agree that, according to the specific needs of different regions and sub-regions, regional or sub-regional centres for training and technology transfers regarding the management of hazardous wastes and other wastes and the minimization of their generation should be established.

Article 12 of Stockholm convention: That parties shall provide...The performance...Arrangements, including capacity-building and technology transfer centres at the regional and sub-regional levels, to assist developing country and economies in transition parties to implement their obligations under the convention.

There were comprehensive assessments of the performance and sustainability of the 14 BCRCs and 16 SCRCs worldwide in the COPs in 2015 and 2019. BCRC China has scored a full mark of 100 on both assessments. It is the only one in the world with the highest evaluation score.
Production & application of PBDEs

PBDEs have been used since 1970s, and countries of production are:

1. C-PentaBDE was produced mainly in Israel, Japan, the United States, the European Union and China ([UNEP 2010a](https://www.unep.org)).

2. C-OctaBDE was produced in the Netherlands, France, the United States, Japan, the United Kingdom and Israel.

3. The production of c-DecaBDE was estimated at over 1.1 million tonnes until 2005. Since 2005, the production of DecaBDE has been about 100,000 tons in the world.

PBDEs have been detected in electrical and electronic equipment, textiles, automotive interior materials, building materials, and children’s toys.
PBDEs under the Stockholm Convention

In May 2009, the Stockholm Convention on Persistent Organic Pollutants (POPs) was amended by the Conference of the Parties (COP) to the Convention to include several polybrominated diphenyl ethers (PBDEs) in its Annex A:

- Hexabromodiphenyl ether and heptabromodiphenyl ether
- Tetrabromodiphenyl ether and pentabromodiphenyl ether
- From 24 April to 5 May 2017, taking note of the recommendation by the Persistent Organic Pollutants Review Committee that decabromodiphenyl ether (BDE-209) of c-decaBDE be listed in Annex A to the Convention.
PBDE management in the world

1970's

1989

Germany and Netherlands initiated the sale of PBDEs-containing articles

1990

Japan voluntarily stopped production of commercial PentaBDE

1992

1997

15 original European Union countries stopped production of commercial PentaBDE

1998

PBDEs included in priority pollutants of action plan for the protection of the marine environment of the northeastern Atlantic

2003

Rotterdam Convention listed PentaBDE as controlled chemicals

2004

PBDEs included in priority chemicals inventory of the protection organization of the marine environment of the northeastern Atlantic

2005

Japan voluntarily stopped importation and sell OctaBDE

2006

European Union countries banned articles containing more than 0.1% Penta and OctaBDE from market

2007

China issued measures and requirements related to PBDEs

2008

Sweden limited use of DecaBDE in textiles; furniture and e-products

2009

Tri-BDEs to DecaBDEs were listed in the hazardous substance inventory of Canadian environmental protection law

2008

Canada prohibited all production of PBDEs

2012

Commercial PentaBDE and OctaBDE were listed in the POPs inventory of the Stockholm Convention

2014

Norway banned use of PBDEs in consumer articles

2014

Maine and Washington U.S. prohibited use of PBDEs in mattresses and furniture

The largest commercial producers and suppliers of DecaBDE in the United States agreed to phase out use of the chemical by 2012.
China Trust fund project “Capacity-Building for Environmentally Sound Management (ESM) of Polybrominated Diphenyl Ethers (PBDEs) and Their Waste in Selected Asia-Pacific Countries”

On 16 December, 2015

On 27 November 2015

On 17 February, 2016

- Feasibility study on separation of PBDEs containing waste from the general waste stream.
- Generate awareness on PBDEs management
- Establish an information platform on PBDEs management and operational activities
Technologies on PBDEs containing plastic sorting

- **Dry method**
  - light separation;
  - electrostatic separation;
  - wind power separation.

- **Wet method**
  - density separation;
  - sink and float separation.

According to different densities of polymers, using liquid media with appropriate densities can separate.

Near infrared (NIR) technology

Not suitable for black plastic polymers. For the flame retardant plastic sorting, only some parameters need to be set up, then the device will automatically separate the plastic.

Experienced workers observe the appearance of the plastic characteristics to distinguish whether plastic containing flame retardant by touch, eyes view.
Sino-Norwegian cooperation project on capacity building for reducing plastic and microplastic pollution (SINOPLAST)

- **Partners:**
  - Norway side:
    - Norwegian Environment Agency (NEA)
    - Norwegian Institute for Water Research (NIVA)
  - China side:
    - MEE (Applicant)
    - Basel Convention Regional Centre for Asia and the Pacific (BCRC China) (Executing unit)
    - Solid Waste and Chemical Management Center (SCC MEE)
    - National Maritime Environmental Monitoring Centre (NMEMC MEE)
    - State Key Laboratory of Estuarine and Coastal Studies of East China Normal University

- **Timeline:** 3.5 years
- **Budget requested from Norway:** 26 mill NOK

**IMPACT**
- Reduced plastic waste and marine litter originating from China

**OUTCOMES**
- Baseline for litter and plastic waste established
- Monitoring capacity improved
- Reduced litter and plastics in selected catchments
- Management tool created
- Cost-benefit and societal impacts analysis carried out
- Capacity and awareness increased
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Basel Convention Regional Centre for Asia and the Pacific

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