Best Available Techniques

Cornelis Braams, UN ESCAP Consultant
Best Available Techniques (BAT)

- Overview of the history and application of BAT
  - Policies and practices in different regions and countries
  - USA, EU, India, China, Japan, Korea, Russian Federation, New Zealand
  - OECD studies (2016-2021)

- Future developments of BAT processes in North- and Central Asia
  - application of BAT in the EU and the Russian Federation; sharing knowledge and experiences with Caucasian- and Central Asian countries
  - Importance of BAT for signing the key protocols of CLRTAP
Best Available Techniques (BAT)

- Since the industrial revolution the need to prevent and control emissions from industrial installations to air and water has slightly grown and became self-evident in the middle of the 20th century.
- The policy how far to go in reducing emissions has developed fast from that time and different terms have been used to indicate the philosophy behind the means that should be implemented.
- (Best practicable means, best technical means, BATNEEC, BAT)
- BAT was introduced around 1960 and first as an international concept used in the 1992 OSPAR convention for the protection of the marine environment in the North Atlantic for all types of industrial installations.
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- Different policies and practices have been in use in many countries in order to prevent and control industrial emissions to ensure a high level of environmental and health protection.
- In many policy documents in countries, the concept of BAT has been established, sometimes under other names and with a different implementation.
- BAT concepts like BPM, BACT, BATNEEC, BPEO, MACT, RACT, GATPPCs etc.
- To prevent and control industrial emissions, the BAT concept has become the main element for setting emission limit values in environmental permits.
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- However different definitions of BAT have been formulated, the main element is the technology-based approach, in some countries combined with an approach based on environmental quality. (EQO concept)

- Underlying criteria can explicitly been found in legislation or in multilateral directives but these are not always clear, e.g. how techniques are selected, how economic arguments like cost-effectiveness play a role, and how associated emission limit values are established.

- Besides in national policies and legislation BAT, the technology-based approach, is used in important multilateral environmental agreements like the Minamata Convention on Mercury, the Stockholm Convention on POPs, the Ospar Convention and the EU Industrial Emission Directive.
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In the EU Industrial Emission Directive (2010/75/EU) the definition of BAT has been described as follows:

“Best available techniques” means the most effective and advanced stage in the development of activities and their methods of operation which indicates the practical suitability of particular techniques for providing the basis for emission limit values and other permit conditions designed to prevent and, where that is not practicable, to reduce emissions and the impact on the environment as a whole (Article 3 Definitions under (10))
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- Best available techniques are state-of-the-art techniques for prevention and control of industrial pollution that are developed on a scale that allow for implementation under technically and economically viable conditions.
- In 2016 the OECD has started a comprehensive project on BAT that is still running and has until now delivered 5 “Activity” reports (funded by the EC).
- Background for this project is the high level of resources and knowledge that has been invested by regions and countries, the large impact on the prevention and control of emissions to air and water and the added value in sharing experiences without making comparisons and assessment of “the best approach”
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- Overall objective of the OECD project is to assist countries in implementing policies, legislation and practices on application of BAT to prevent and control emissions to air, water (and soil) (prevent and control of chemical pollution)

- The first study has been published in 2017 and the last in December 2021:
  Activity 1: Policies on BAT or similar concepts around the world
  Activity 2: Approaches to Establishing BAT around the world
  Activity 3: Measuring the Effectiveness of BAT policies
  Activity 4: Guidance Document on determining BAT, BAT-associated Environmental Performance Levels and BAT-based permit conditions
  Activity 5: Value Chain approaches to determining BAT for industrial installations
  Activity 6: Cross-country comparisons of BAT for selected sectors (in future)
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Deliverables of the OECD’s BAT project, 2016-2022

Policies on BAT or Similar Concepts Across the World (2017)
Approaches to Establishing BAT Around the World (2018)
Measuring the Effectiveness of BAT Policies (2019)
Guidance document on how to determine BAT and associated emission levels (forthcoming)
Study on the value chain aspects of BAT determination (forthcoming)
Cross-country comparisons of BAT for selected sectors (forthcoming)

All reports available free of charge: oe.cd/bat
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- The OECD Activity 1 Report is an inventory of information on policies and practices that are based on BAT or similar concepts in 7 OECD member or partner countries or regions (USA, EU, India, Russian Federation, China, Japan and New Zealand).

- Key questions are: how is BAT defined? to which sectors, activities and pollutants does it apply? is it technology based? which parties are involved in the information exchange? how is BAT integrated in environmental legislation?

- The inventory has been performed with the help of an expert group of around 50 people from the 7 countries and OECD/EU (M.Hjort /T. Ito, OECD, 2017)
The report on OECD Activity 2: Approaches to Establishing BAT around the world includes 7 country chapters and contains the first international compilation of BAT documents (OECD 2018, M. Hjort/T. Ito).

The EU, Korea and the Russian Federation use the term BAT, the USA uses different terms for different situations, (BACT, RACT, LAER, MACT, NSPS), India uses Best Techno-economically Available Technology, China Available Technologies and New Zealand Best Practicable Options.

All countries that were examined use official reference documents for BAT, mostly developed for specific industrial sectors, but there are also thematic documents (e.g. In the EU the BAT reference document on cooling systems, the BAT reference document on storage). The EU, Korea and Russian Federation use BREFs, the USA uses different formats for BAT documents, depending on the air quality situation in the area and on performance standard programs.
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<th>Documents presenting or reflecting BAT</th>
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- In most countries or regions the association between BATs and emission limit values in permits is established in specific environmental legislation for emissions to air and water (not to soil).

- The general approach is that Emission Limit Values are legally binding but the BATs, on which the ELVs are based, are not compulsory prescribed which gives flexibility to the operators to meet the targets; the risk however of this approach is that less process integrated techniques are implemented in favour of end-of-pipe solutions.

- In the Russian Federation, the EU, Korea and China a standardized method to establish BATs is used, in India this applies for ELVs, where in the USA the procedures vary across programmes, sectors and cases.

- The establishment of BAT documents can last from 1 to 4 years, depending on the procedures and organization, which could be a problem if BAT development is faster.
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- The BAT documents are in general the result of a comprehensive process with different stakeholders: governments, competent authorities, company and industrial organisation representatives, experts and ngo’s. In the case of the EU this process should be organized for up to 27 countries and the final decision on a BAT Reference document must be taken according to EU Comitology.

- Sharing of information on processes like data on economic aspects of techniques is essential but not always achieved due to strategic reasons.

- Surveys, monitoring- and literature data are the main sources of information.

- Standardized procedures to establish BAT include the set up of a Technical Working Group. In the EU the Seville Process has been established since 1996 (European IPPC Bureau).
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Sevilla Edificio Expo (La Cartuja)
JRC REFERENCE REPORT

Best Available Techniques (BAT) Reference Document for Iron and Steel Production

Industrial Emissions Directive 2010/75/EU
(Integrated Pollution Prevention and Control)

Rainer Remus, Miguel A. Aguado-Monsanet,
Serge Roudier, Luis Belgada Sanchez

2013
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- Other international BAT initiatives:
  - World Bank Group Industry sector Guidelines
  - BAT Guidelines under the Stockholm- (POPs) and Minamata (Hg) Conventions
  - UNIDO activities in developing countries
  - The Task Force on Technical and Economic Issues (TFTEI) of the UN-ECE
    Convention on Long-Range Transboundary Air Pollution
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- OECD Activity 3: Measuring the effectiveness of BAT-policies:
  - Extensive analysis of data and methodologies to evaluate the effectiveness of the policies to prevent and control industrial emissions using BAT
  - Ten chapters addressing specific countries and regions: USA, EU, Russian Federation, China, Chile, Israel, India, New Zealand, Korea and Kazakhstan
  - Many countries do not yet have the appropriate datasets for an adequate analysis of the effectiveness of BAT-based policies
  - Data can be derived from Pollution Release and Transfer Registers (PRTR) or Continue Emission Monitoring Systems (CEMS)
  - Highlighted advantages of existing BAT policies are level playing field (EU), improved energy and resource efficiency (RF), upgrade of the industry (RF)
  - Case studies show that BAT implementation causes considerable improvement on air quality, more efficient operations, integrated permitting and participation
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- OECD Activity 4: In 2020 the OECD has issued a Guidance Document on BAT, BAT-Associated Environmental performance levels and BAT based permit conditions.

- Objectives: - strengthen policies on BAT in individual countries
  - facilitate international harmonization of procedures to establish BAT and BAT-AE(P)Ls

- The Guidance Document includes all elements for countries to set up a BAT based permitting system that have been discussed in the previous reports like selecting industrial sectors to apply BAT, setting up a multi-stakeholder Technical Working Group, the criteria for determining BAT and determining BAT-based permit conditions.
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- OECD Activity 5: in December 2021 the report "Value chain approaches to determining BAT for industrial installations" has been issued in cooperation between the OECD and the US-EPA.

- The study aims to examine existing BAT frameworks such as BREFs to identify and assess gaps (environmental impacts, production processes, effectiveness in mitigating emissions) and to address these through the application of value chain approaches.

- OECD Activity 6: Cross-country comparisons of BAT for selected industrial sectors (still pending)
UN-ECE Environmental Performance Reviews for Caucasian and Central Asian countries in the last 5 years show that application of BAT and integrated permitting is often on schedule for coming years but in general not yet practiced. Kazakhstan plans to introduce BAT-based integrated permitting after 2019 with priority for large combustion plants.

Emission limit values in permits are still calculated by methodologies that were used during the time of the Soviet Union.

This situation is mainly caused by lack of funding and human resources for starting integral permitting using BAT.

As a consequence it is difficult for the countries that are a Party to the CLRTAP to access to the key protocols of this Convention, the Gothenburg Protocol and the Protocols on Heavy Metals and POPs.
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- The EU countries have started with the practice of integral environmental permitting and application of BAT in 1996 with the IPPC Directive that together with some sectoral Directives was taken up in the Industrial Emission Directive (2010)

- The Russian Federation has introduced a BAT based policy to prevent and control industrial emissions in 2014 and adapted its legislative acts; the policy entered into force in 2018. BAT-based integrated environmental permitting is under implementation. By 2024 7000 installations should have to apply for these permits

- In the meantime more than 50 BREF documents have been established, partly based on EU counterparts and published as standard documents. BAT conclusions are in preparation with priority for Russian techniques

- Continuous Emission Monitoring Systems are implemented by operators, no PRTR
LIST OF 300 PILOT ENTERPRISES

The list of category 1 - 300 objects exercising negative impact on the environment is finalized. Contribution of these objects in the total volume of emissions and discharges in the RF account for at least 60%.

Decree by the Ministry of Natural Resources and Environment of the RF dated as of 18.04.2018 № 154

From: BAT in Russia, V. Venchikova (2019)
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- For the Caucasian and North and Central Asian countries, the way to proceed in order to start the transition to BAT-based integrated environmental permitting should be to strengthen the cooperation with the Task Force on Techno-Economic Issues of the CLRTAP (TFTEI) that works in close collaboration with the Russian Federation (through the Scientific Research Institute for Atmospheric Air Protection), that form the Coordinating Group for EECCA countries.

- Documents of the Coordinating Group can serve as tools for setting ELVs based on BAT, as they are specially developed for countries with economies in transition.

- Further support should be directed on access to the key protocols of the CLRTAP.

- Use of EU BREFs that have more stringent BAT-based ELVs can be a future step.
INTERNATIONAL COOPERATION

- Harmonization of the BAT-related legislation
- Monitoring of the transboundary pollutants transport

Joint Research Centre European Commission

- Approaches to setting BAT-AEL
- Tools and methods of the BAT economic assessment

Russian BAT Bureau
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- Thanks for your attention