Clear Waters from Pharmaceuticals

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Background

- Growing concern over potential environmental impacts of pharmaceutical residues.
- HELCOM and UNESCO identified knowledge gaps.
- Need to reduce emissions: advanced treatment of wastewater and upstream measures.

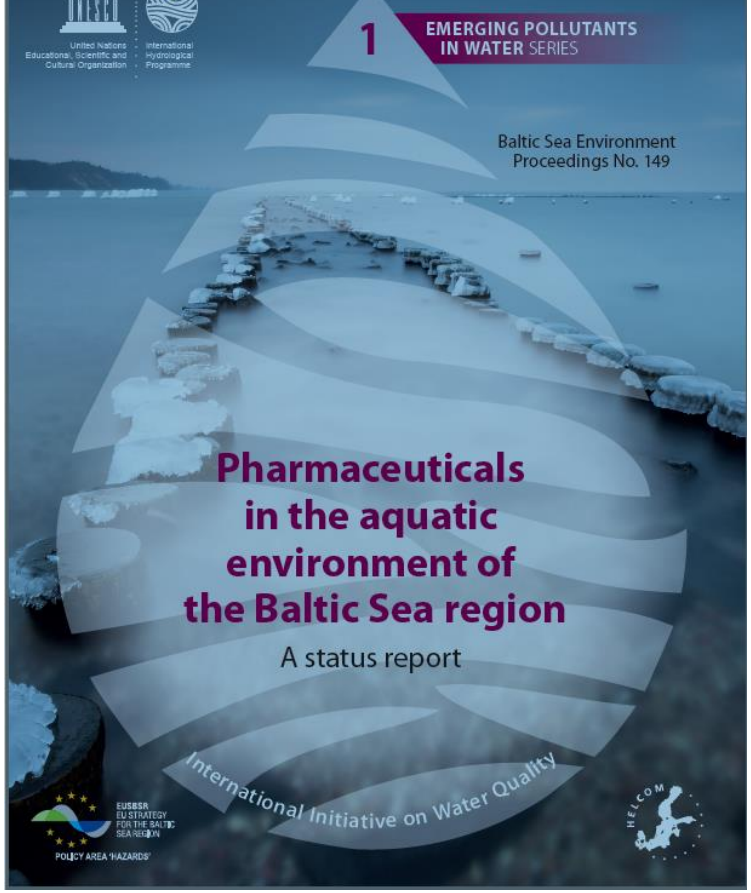

Table 1. *An overview of data provided in response to a HELCOM questionnaire on occurrence, sources and pathways of pharmaceuticals in the Baltic Sea region.*

Source: Original data.

Country	Production & waste		Sales, Consumption		Monitoring data					
	Production	Waste management	Human	Veterinary	WWTPs	Sludge	Rivers	Sea water	Sediments	Biota
Denmark					●	●	●	●		
Estonia		●	●		●		●	●	●	
Finland	●	●	●	●	●	●	●	●	●	
Germany		●	●	●	●		●	●		
Poland								●		
Russia			●		●			●		
Sweden		●	●		●	●	●	●	●	●

CWPharma
CLEAR WATERS FROM PHARMACEUTICALS

Overall aim

Decrease the emissions and adverse effects of pharmaceuticals in the Baltic Sea region.

Give tools and recommendations to policy makers, authorities and municipalities on the best ways to reduce emissions.

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CWPharma – brief facts

- Funding:

  EU:s Interreg Baltic Sea Region Programme: 2.9 M€
  Total budget: 3.7 M€

- Duration: October 2017 – September 2020

- Flagship project

- Baltic Sea Pharma Platform

Interreg Baltic Sea Region

EUROPEAN UNION

EUROPEAN REGIONAL DEVELOPMENT FUND

EU STRATEGY FOR THE BALTIC SEA REGION FLAGSHIP

BALTIC SEA PHARMA PLATFORM

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15 project partners from 7 countries

Country	Organisation
FI	Finnish Environment Institute (SYKE) – Lead partner, WP4 leader
FI	Finnish medicines agency (Fimea)
FI	Helsinki Region Environmental services Authority (HSY)
SE	County administrative board Östergötland (CAB) – WP2 leader
SE	Tekniska Verken i Linköping (TVAB)
EE	Estonian Environmental Research Centre (EERC)
EE	Estonian Waterworks Association (EVEL)
DK	Aarhus university (AU)
DK	Kalundborg Utility – WP5 leader
PL	Institute of Environmental Protection – National Research Institute (IO
LV	Latvian Institute of Aquatic Ecology (LIAE)
LV	Latvian Environment, Geology and Meteorology Centre (LEGMC)
DE	Berlin Center for Competence of Water (KWB) – WP3 leader
DE	German Association for Water, Wastewater and Waste (DWA)
DE	German Environment Agency (UBA)

20 associated organisations

	Organisation Type	Organisation (English)
FI	National public authority	Ministry of the Environment
EE		Ministry of the Environment
FI	Regional public authority	Centre for Economic Development, Transport and the Environment for Uusimaa
FI		Regional State Administrative Agency for Southern Finland
SE		Region Östergötland, Environment and Security department
SE	Sectoral agency	Swedish Environmental Protection Agency
SE		Medical Products Agency
SE		The Swedish Agency for Marine and Water Management
DK		Danish Environmental Protection Agency
SE	Interest groups including NGOs	The Swedish Association of the Pharmaceutical Industry AB LIF
SE		The Swedish Water and Wastewater Association
FI		Finnish Water Utilities Association
FI		Pharma Industry Finland (PIF)
FI		Association of Finnish Pharmacies
SE		Coalition Clean Baltic
DK		Danish Waste and Wastewater Association (DANVA)
BY		Center for Environmental Solutions
LV	Infrastructure and public service provider	Riga water, Ltd.
DE		Berlin Water Company, Research and Development
SE	Higher education and research institution	IVL Swedish Environmental Research Institute

Five work packages

Work packages (WP2)
Emissions, levels and risks

Work packages (WP3)
Advanced wastewater treatment

Work packages (WP4)
Low-tech risk reduction

Work packages (WP5)
Conclusions and Action Plan

Work packages (WP1)
Project management

WP2: Comprehensive status of pharmaceuticals

GoA 2.1 Sources and environmental levels of pharmaceuticals

Sampling in case study areas and mapping of consumption of pharmaceuticals.

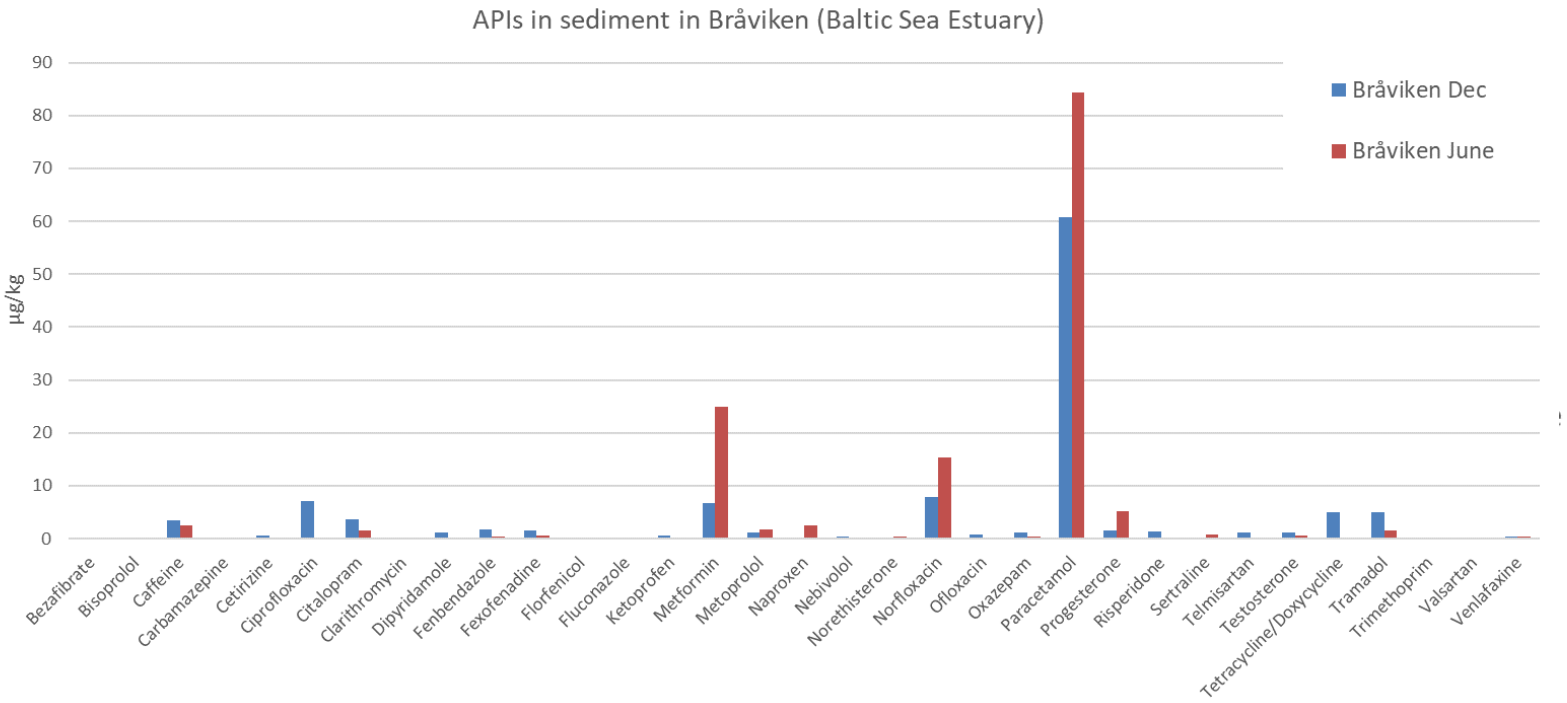
GoA 2.2 Environmental risk assessment of pharmaceuticals

Identify environmental risky compounds.

GoA 2.3 Upscaling of screening data to BSR

To get an overall picture of sources and the occurrence of pharmaceuticals.

Case study Motala ström



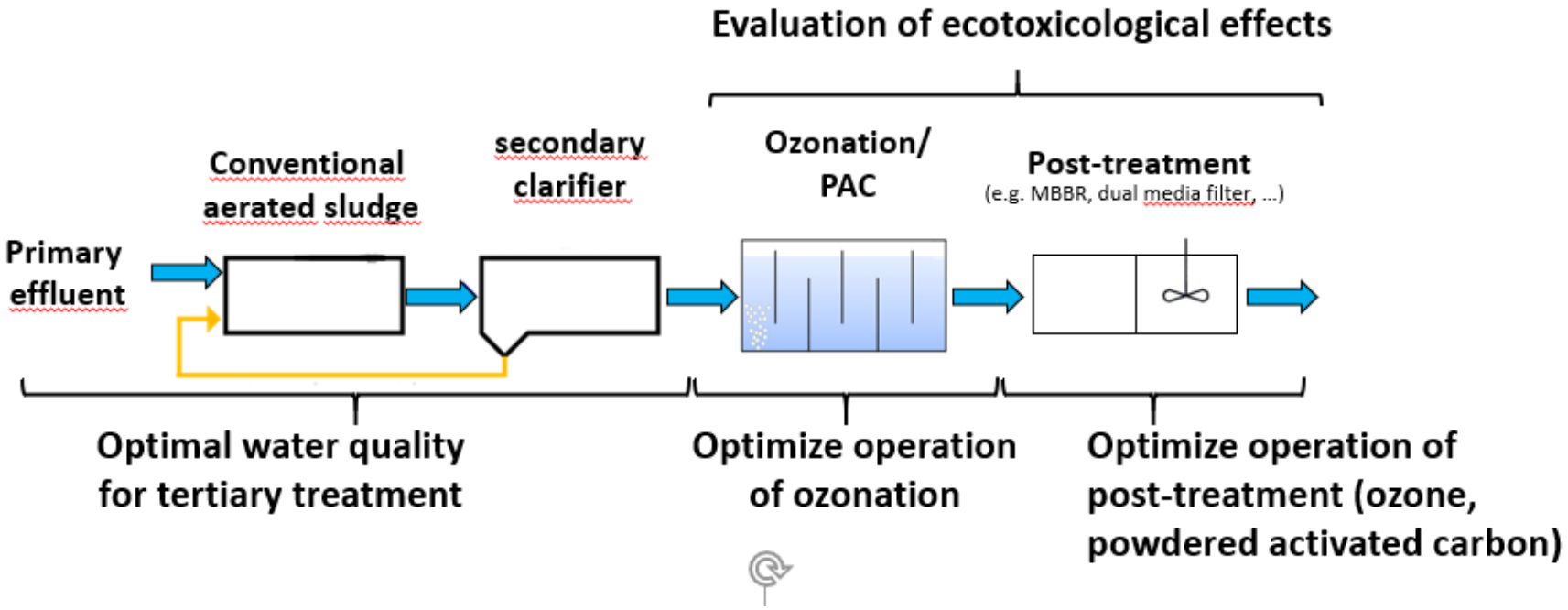
WP3: Advanced wastewater treatment

GoA 3.1
Pharmaceutical removal at full scale

GoA 3.2
Flexible use of existing infrastructure

GoA 3.3
Comparison of post-treatment options

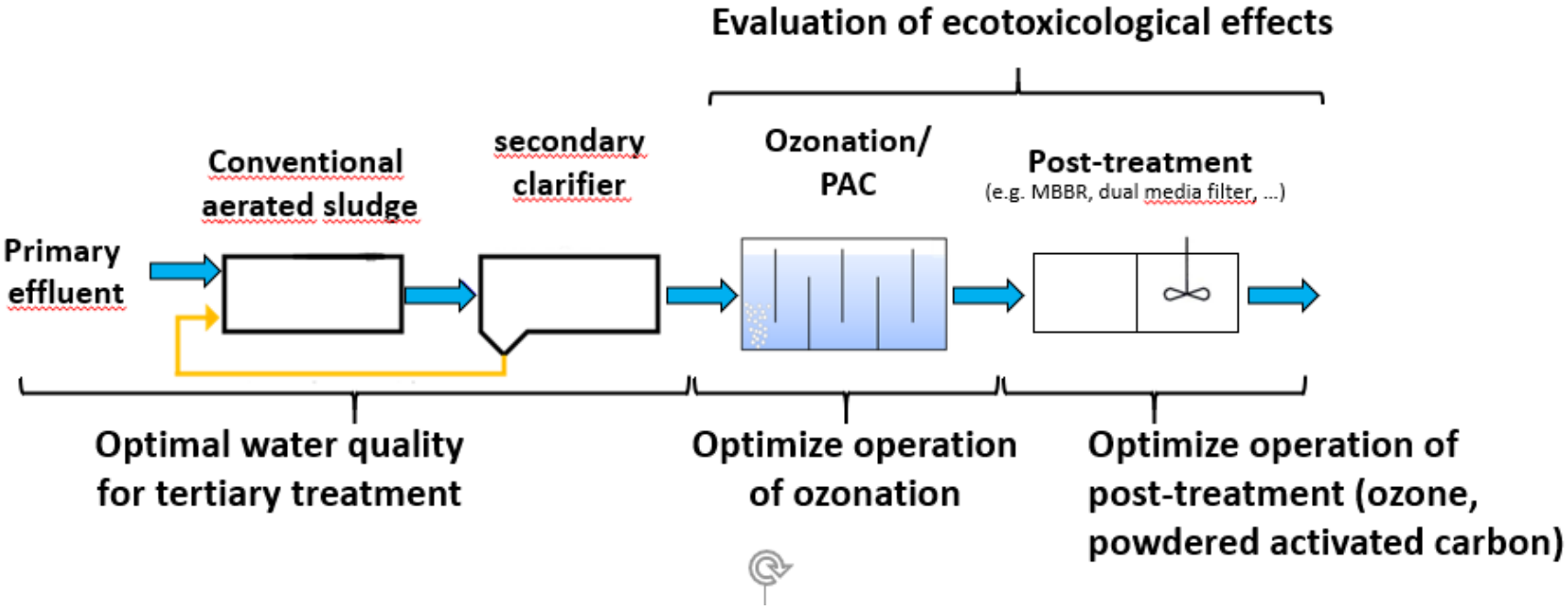
GoA 3.4
Optimization and control of advanced treatment



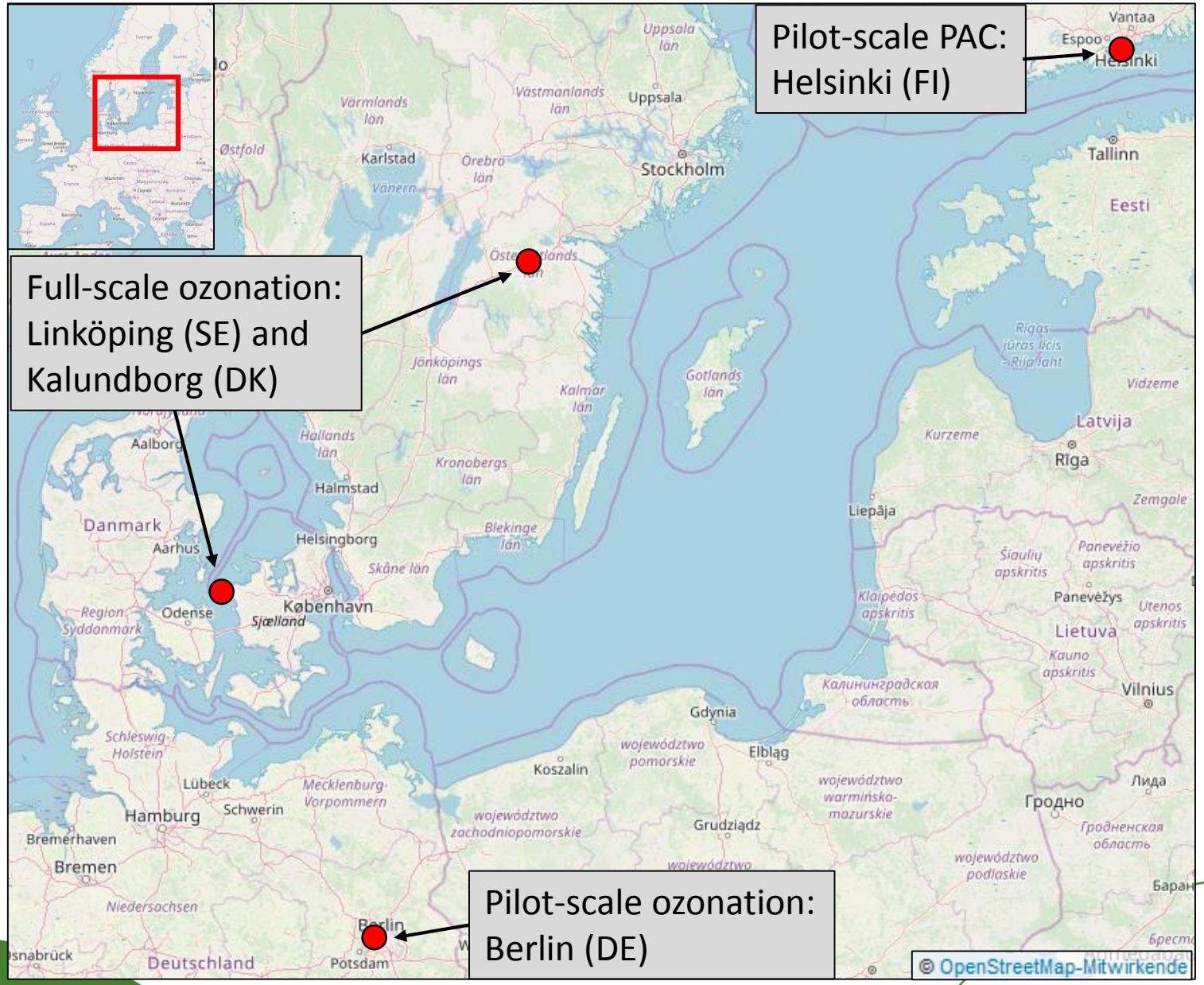
WP3: Advanced wastewater treatment

Focus on the whole WWTP process:

- What is important for WWTP operation to provide a good water quality for tertiary treatment (e.g. DOC, nitrite and TSS)?
- Do's and Don'ts at the design and operation of an ozonation for API elimination.
- Can ecotoxic effects be found, and does ozonation and post-treatment affect it?
- Impact of ozonation post-treatment and how to operate it optimally.
- Also topics linked with the use of activated carbon will be answered e.g. how to remove PAC from treated water.



Four sites: 2 x full-scale, 2 x pilot-scale



Maps used from https://www.openstreetmap.org/

WP4: Low-tech risk reduction

GoA 4.1
Take-back and disposal of unused medicines

GoA 4.2
Increased awareness of API's environmental impacts

GoA 4.3
Enhanced environmental permitting of pharmaceutical plants

- Good practices that already exist in some Baltic Sea countries will be spread to other countries where such practices and systems are inefficient or not yet in place.

API=Active Pharmaceutical Ingredient

Main outputs

- Estimation on current API emissions for the Baltic Sea region (WP 2)
- Guidelines on advanced wastewater treatment (WP 3)
- Recommendations on low-tech practices to control and reduce API emissions (WP 4)
- An overall Action Plan on the best emission reduction measures (WP 5)

API=Active Pharmaceutical Ingredient

Thanks for your attention!

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