



PFAS-ANALYSIS IN THE CONTEXT OF A REACH RESTRICTION

KICK OFF MEETING ON THE 5TH OF MAY,

NORWEGIAN ENVIRONMENT AGENCY – CASE NUMBER 2021/2019

RAMBOLL DEUTSCHLAND GMBH IN COOPERATION WITH THE FLEMISH INSTITUTE FOR TECHNOLOGICAL RESEARCH (VITO)

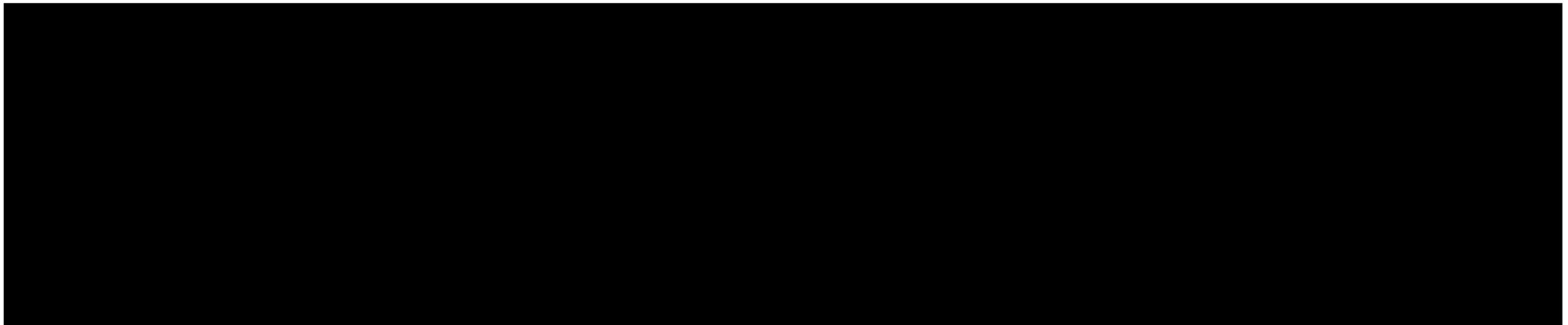
Agenda

- 1. TOUR DE TABLE AND PRESENTATION OF RAMBOLL & VITO (ALL)**
- 2. BRIEF BACKGROUND AND POLICY CONTEXT BY NORWEGIAN EPA**
- 3. KEY DISCUSSION POINTS (RAMBOLL)**
- 4. BRIEF OVERVIEW ON METHODOLOGY (RAMBOLL & VITO)**
- 5. TIMELINE AND MILESTONES (RAMBOLL)**
- 6. AOB**

Project team

PROJECT TEAM

EXPERTS FROM RAMBOLL & VITO




PhD Food
Chemistry
Ramboll, Project
manager


PhD Biochemistry
Ramboll, Expert


PhD Pharmaceutical
Sciences
Vito, Senior Expert


Master in Industrial
Science
VITO, Expert


PhD Organic
Chemistry
VITO, Senior Expert

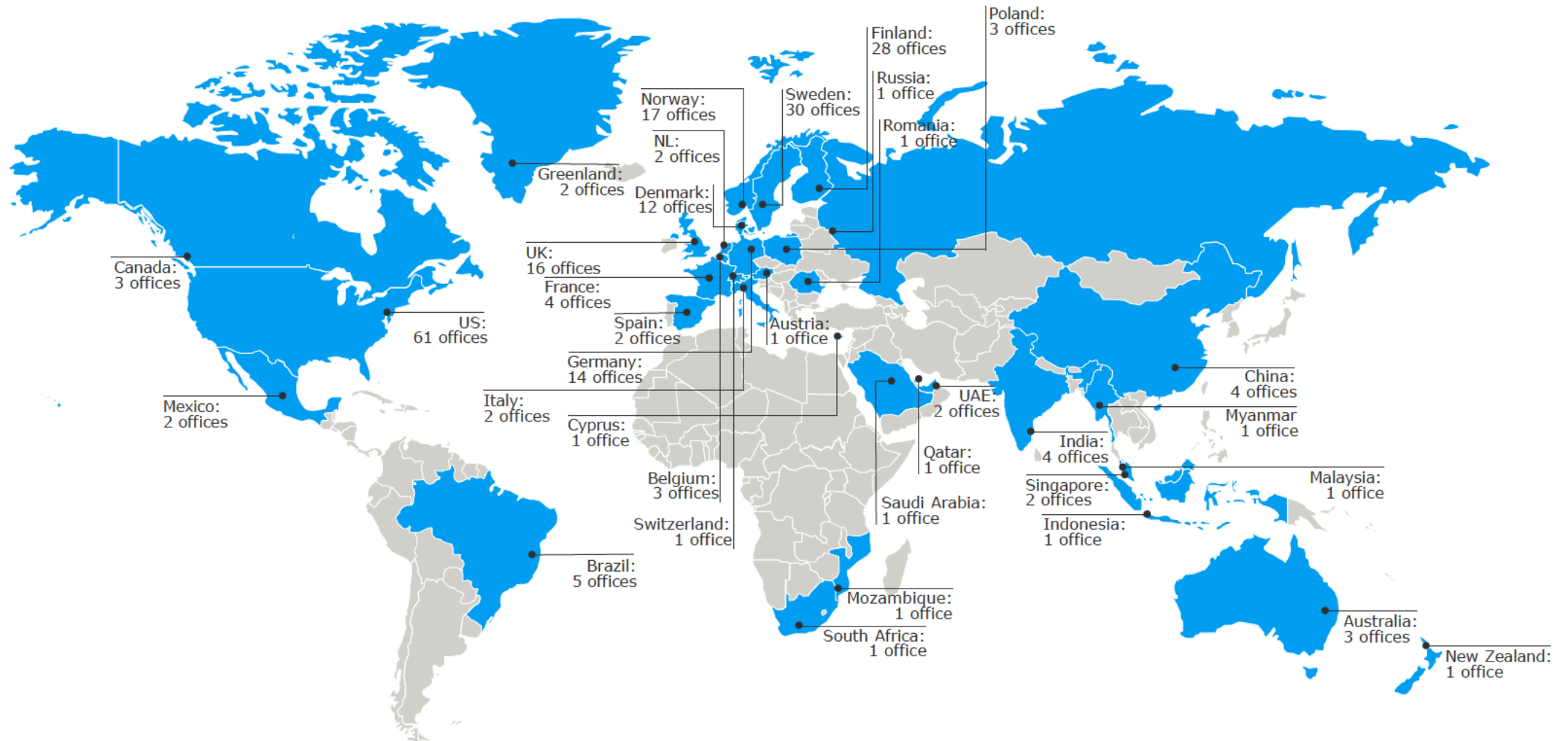


RAMBOLL

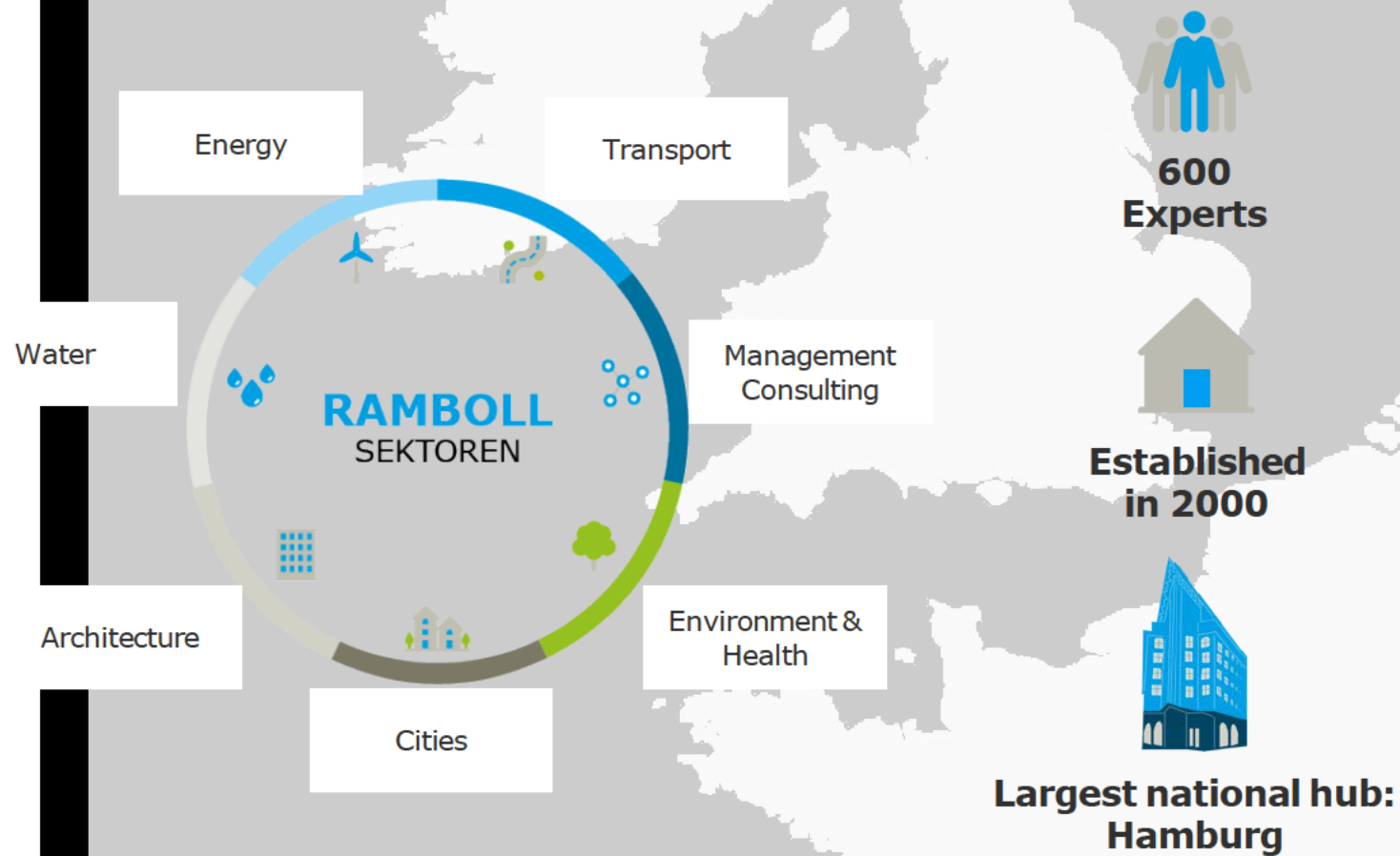
Ramboll in brief

- Independent engineering, architecture and consultancy company
- Founded 1945 in Denmark
- 16,000 experts
- Present in 35 countries
- Particularly strong presence in the Nordics, the UK, North America, Continental Europe, Middle East and Asia Pacific
- EUR 1.827 billion revenue
- Owned by Rambøll Fonden – The Ramboll Foundation

GEOGRAPHICAL FOOTPRINT



RAMBOLL IN GERMANY



OUR MISSION IS TO MAKE FLANDERS
AND THE WORLD MORE SUSTAINABLE



ENERGY



CHEMISTRY



MATERIALS



HEALTH



LAND USE

What we do

- We characterise materials and chemicals
- Fit-for-purpose
- Proven quality
- Complementary technology
- Flemish reference lab
- We (can) go further ...

Activity areas

- (Green) chemistry
- Bioaromatics
- Biomass
- Pharmaceuticals
- Environmental
- Material recycling and re-use
- Food safety/quality
- Human biomonitoring
- Nano characterisation

Customers

- Multinationals
- SMEs
- Governments
- NGOs
- Research institutes



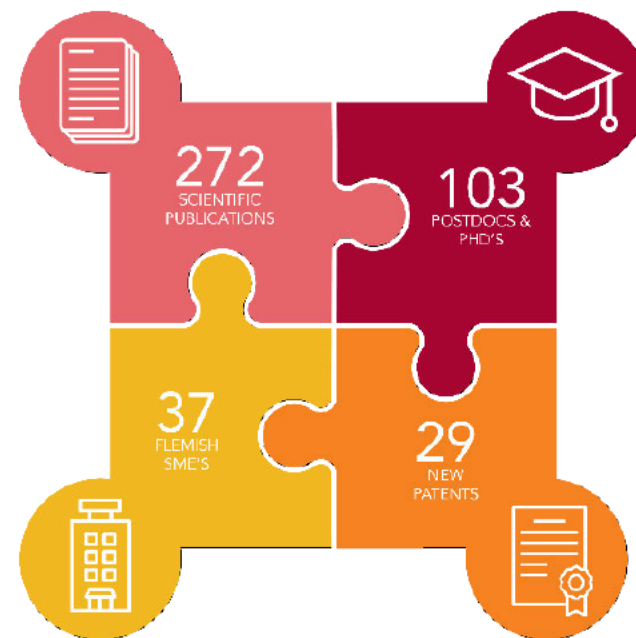
Some numbers



Business Revenue	81 036
Activation R&D	66 800
Grants	45 563
Financing Reference Tasks	11 727
Totaal	205 126 (kEUR)



Salaries	84 332
Depreciation R&D	66 800
Operating Means	42 661
Normal Depreciation	8 358
Totaal	202 151 (kEUR)



Key discussion points

KEY DISCUSSION POINTS

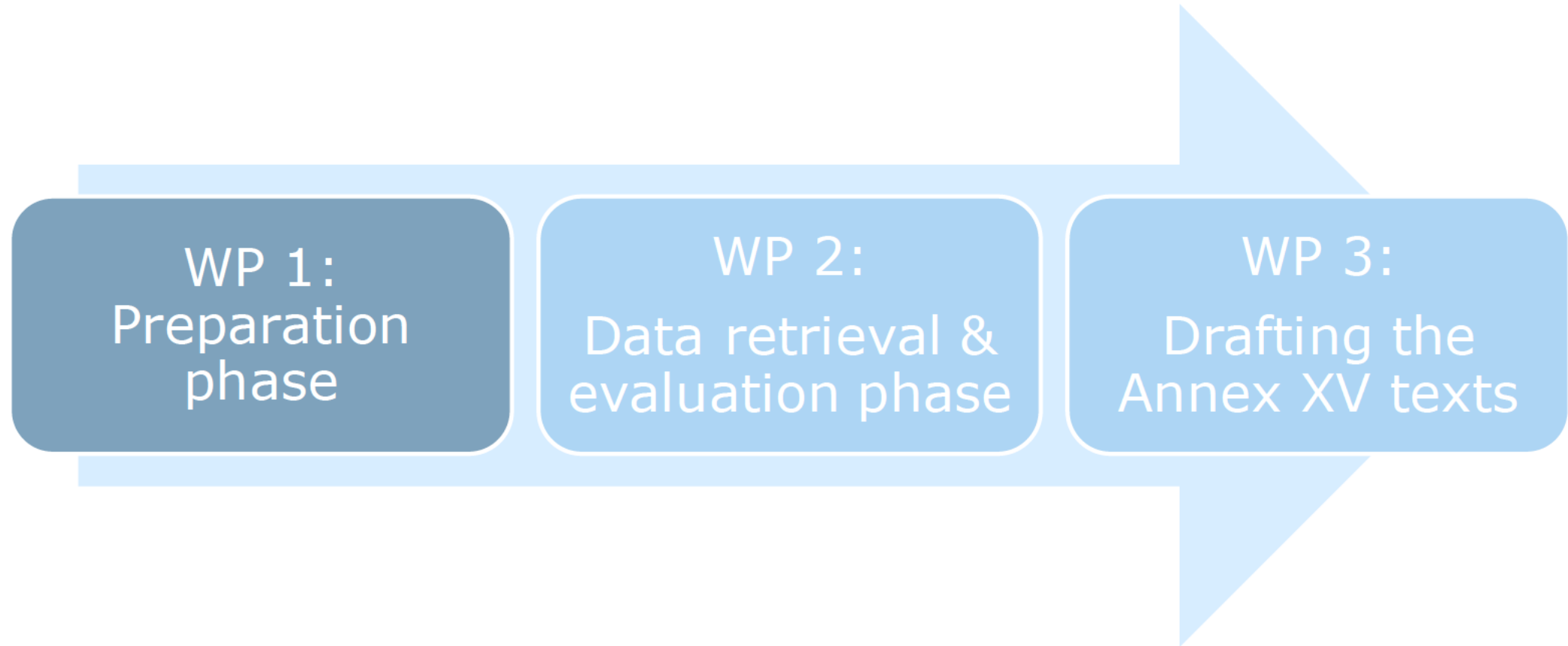
- Open questions on application matrices
- Search Strings (will also be addressed in inception report)
- Choice of reference management programme (Endnote or Mendeley)



We will come back to these aspects within the next slides.

Methodology

OVERVIEW METHODOLOGY



WP 1: PREPARATION PHASE

ANALYTICAL METHODS

- Analytical methods will be grouped in
 - Targeted Screening (Ionic and neutral PFASs)
 - Non-specific method: Total Organic Fluorine (TOF), Total Extractable Fluorine (TEF), Total Oxidizable Precursors (TOP)
 - Suspect or non-target screening method that involve a broad MS-screening that matches with m/z-values listed in databases

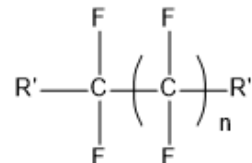
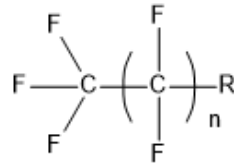


WP 1: PREPARATION PHASE

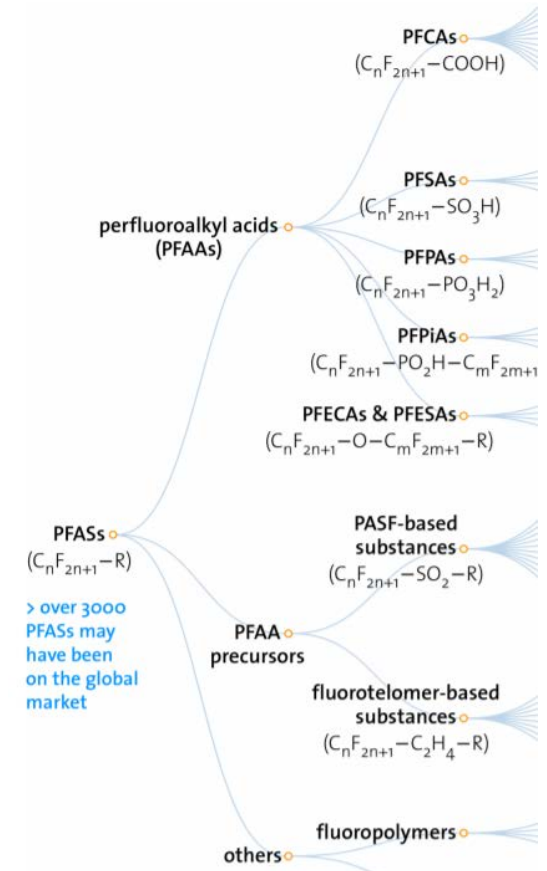
RANGE OF SUBSTANCES

- Range of substances will be based on the PFAS-definition of the restriction proposal:

“Substances that contain at least one aliphatic -CF₂- or -CF₃ element incl. fluoropolymers and F-gases (as defined in the RMOA suppl. Information see [here](#))”



- Specific substances will be grouped according to their position in the PFAS family tree (e.g. PFCAs, PFSAAs, FT-based, perfluoroalkyl ethers, fluoropolymers and side-chain fluorinated polymers) based on [Wang et al. 2017](#)



WP 1: PREPARATION PHASE

MATRICES TO COVER

- Generally: PFAS restriction will cover any PFAS in any matrix
- As a starting point: matrices will be based on the table sent by NO EPA (see next slide)
 - “Importantly, this table may be extended a bit as we are in a process to identify any possible information gaps in the PFAS applications”
- Fire fighting foams not considered in restriction but in standalone report (own restriction)

WP 1: PREPARATION PHASE

MATRICES TO COVER



Open questions?

Application	
Textiles, leather and apparel and textile related products (technical textiles?)	SE, DK
Packaging material, FCM and food & feed processing equipment	NL
Consumer mixtures	DE
Lubricants and construction products	DK
Cosmetics	SE, DK
Production of PFAS, including polymers	NL
Chrome plating	DE
Treatment of skis	NO
Transportation Automotive, Aircraft, Space and Ships	DE
Oil, gas and mining industry	NO
Medical devices, pharmaceuticals	NL
F-gases and refrigerants including blowing agents	NO, DK
PFAS in electric and electronic equipment including semiconductors	DK, NL
Flame retardants & resins and industrial applications	?????
Waste treatment PFAS articles & industrial waste	NL

WP 1: PREPARATION PHASE

INFORMATION - WILL BE ADDRESSED IN DETAIL IN THE INCEPTION REPORT

- Information sources:
 - Screening of available information within the group and known publications like Gluege et al.
 - Agencies (incl. Work by ECHA (C9-C14, PFHxA, ADONA ...) and Stockholm Convention)
 - Scientific peer reviewed literature (Pubmed, EuroPMC), see also search string next slide
 - Standardization bodies (incl. Draft standard methods if available)
 - Eco labels and respective required analytical methods (Grüner Knopf, Blue Angel, Nordic Swan)
 - Projects (HBM4EU, NORMAN...)
 - Targeted Stakeholders



We would like to invite every MS to give input on relevant information e.g., already known publications / projects

WP 1: PREPARATION PHASE

DRAFT SEARCH STRING - WILL BE ADRESSED IN DETAIL IN THE INCEPTION REPORT

SUBSTANCE (incl. Synonyms)

PFAS OR perfluor* OR
polyfluor*

ANALYSIS (incl. Synonyms)

Analytic* OR measure* OR
test* OR qualit* OR quant*
OR standard OR norm

- Only English
- No date range
- Screening based on Titel and Abstracts

MATRIX (incl. Synonyms)

Leather OR garment OR
textil* OR apparel OR
upholstery OR

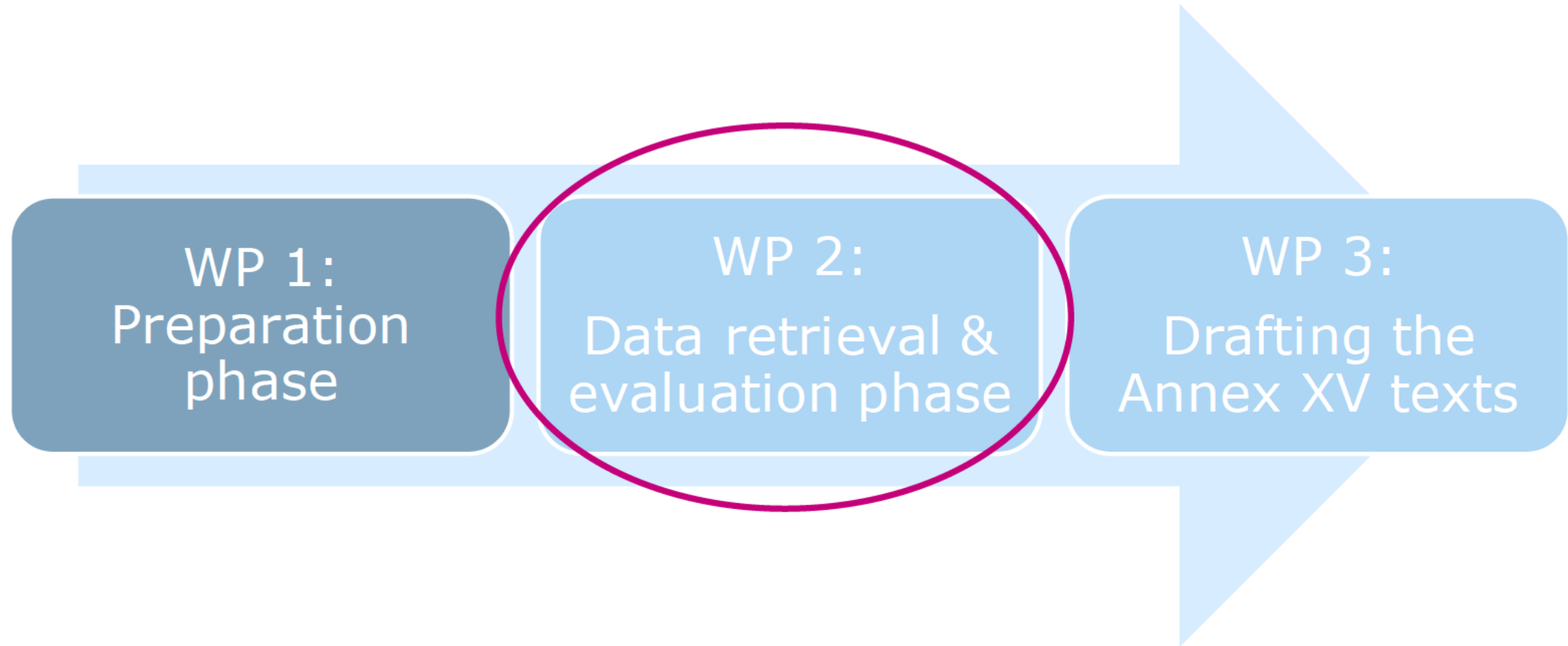


We would like to invite every MS to give input on their specific PFAS-use and their respective matrices in the inception report (we will make a proposal)



Open questions?

OVERVIEW METHODOLOGY



WP 2: DATA RETRIEVAL PHASE

LITERATURE RESEARCH

- Literature search will be thoroughly documented, with the aim that it can be repeated in the future
 - Date of search
 - Search terms
 - Inclusion / Exclusion process of publication by Title, Abstract, Full text
- Every search will be done by two experts
- Endnote or Mendeley can be used (Mendeley stores data online)
- Open access publications will be downloaded



Open questions?

WP 2: DATA RETRIEVAL PHASE

DOCUMENTATION SHEET - WILL BE ADRESSED IN DETAIL IN THE INCEPTION REPORT

- Documentation sheet will contain:
 - Bibliographic information on the reference
 - Substances addressed (if available with CAS and structural formula (SMILES))
 - Brief generic method description/classification
 - Sample amount used
 - Pre-treatment of sample
 - Extraction method
 - Clean up method
 - Information on the measurement/detection/instruments used
 - Quantification method
 - Working range of the method
 - Possible matrices
 - Reported levels – in case indicated
 - Information on validation of the method
 - Limitations (e.g. reported matrix effects)
 - LOD and LOQ
 - Quality level of reference and further comments



Open for input – additional info can be included

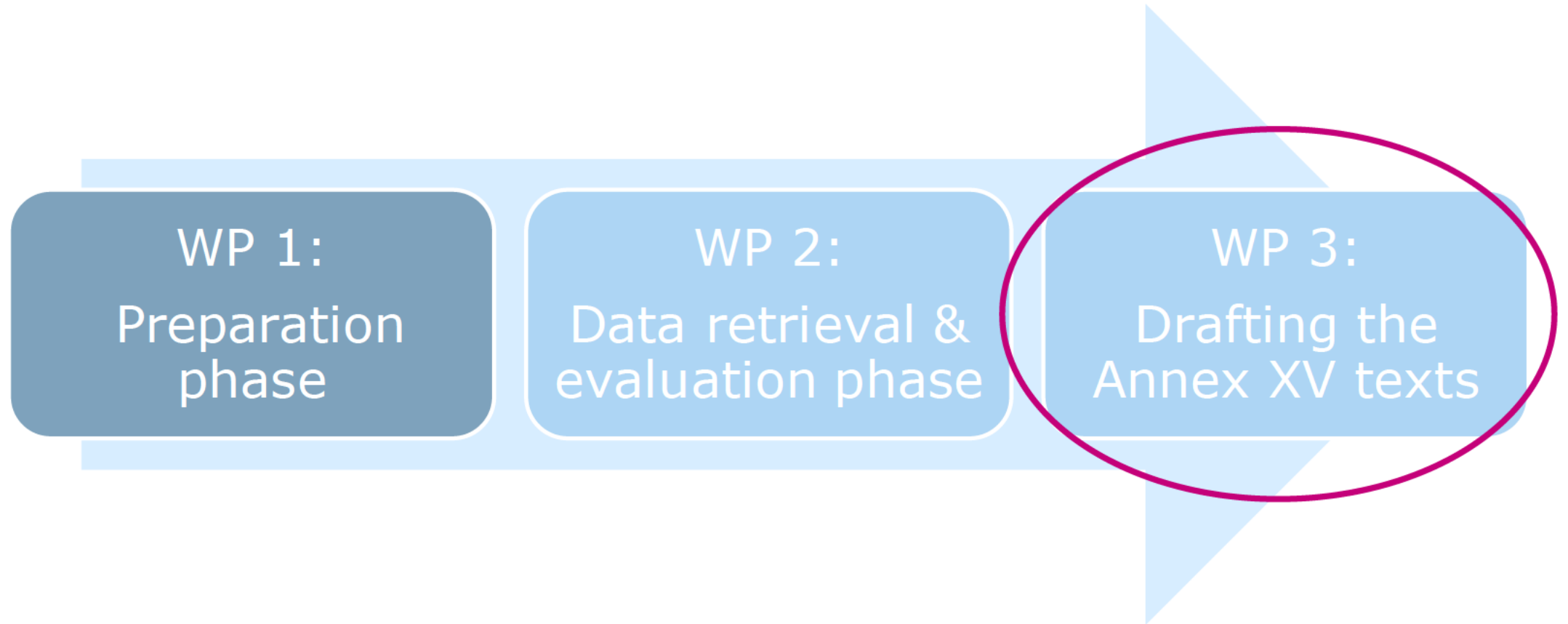
WP 2: DATA RETRIEVAL PHASE

EXEMPLARY TABLE AND STANDALONE REPORT

- Results: Searchable table
- Dense but comprehensive compilation of all search results
- **Stand Alone report** will include description of the methodology & discussion on the availability of analytical methods

Reference	PFAS	Intake dw	Extraction	Clean up	Measurement	Matrix and reported levels (in µg/kg ds)	LoD/LoQ
DIN 38414-14	C4-C10 PFCA C4-C8 PFSA	1 g	Sonication with MeOH	SPE WAX (optional) Elution with MeOH 0.1% NH ₃	HPLC-ESI(-)-MS/MS	Soil Sediment Sludge	LoQ: 10 µg/kg
ASTM D7968-17	C4-C14 PFCA C4-C8 PFSA PFEOHS FHpPrA 6:2 FTCA 8:2 FTCA 10:2 FTCA 2H-perfluoro-2-decanoic acid 2H-perfluoro-2-octenoic acid	2 g	Vortexing and shaking with 50:50 MeOH/water and 50:50 MeOH/water/NH ₃ (pH 9-10)	-	UPLC-ESI(-)-MS/MS	Soil	LoQ: 0.01-0.25 µg/kg RL: 0.25 µg/kg
Munoz 2016	C5-C18 PFCA C4-C10 PFSA FOSA 6:2 FTUA 8:2 FTUA 5:3 FTCA 7:3 FTCA PFOAB PFO5B PFOANO PFO5NO PFOAAmS PFO5AmS PFO5Am	1 g	Vortexing and sonication with MeOH (20 mM NaOH) (2x)	ENVI-Carb Washing with MeOH	UPLC-HRMS (Q-Exactive, RS 70.000)	Sediment <LOD-4.2 µg/kg dw	LoD: 0.0006-0.46 µg/kg
Huset 2018	C4-C8 PFCA C4-C8 PFSA	5 g	Sonication with MeOH (1% NH ₃) (3x)	ENVI-Carb	HPLC-ESI(-)-MS/MS	Soil	LoQ: 0.01-0.03 µg/kg
Joerss 2019	C4-C14 PFCA C4-C10 PFSA PFEOHS HFPO-DA HFPO-TrA HFPO-TeA	5 g	Vortexing and sonication with water (1% HAc) and MeOH/water (1% HAc) (2x)	Oasis WAX Elution with 80/20 MeOH/water and MeOH (0.1% NH ₃)	HPLC-ESI(-)-MS/MS	Sediment <LoQ-2 µg/kg	LoQ: 0.006-0.5 µg/kg

OVERVIEW METHODOLOGY



WP 3: DRAFTING THE ANNEX XV TEXTS

- According to Annex XV it must be possible to monitor the results of the implementation of the proposed restriction. Monitoring is understood in the guidance document widely and may cover any means to follow up the effect of the proposed restriction in reducing the exposure.
- Restriction proposal for PFHxA will be used for guidance
- Ramboll/VITO will draft:
 - **Report, Section 2.7** Practicality and monitorability (summary of annex text)
 - **Annex E, Section E.7** Practicality and Monitorability (i.e. parts that relate to analytical methods)
 - An **appendix to the Annex**, with a summary of the most important methods for analysis of PFASs in relevant matrices, e.g. in a table format.
- Based on information gathered in WP2, addressing all identified gaps and weaknesses related to analytical methods

Timeline, Milestones, & communication

TIMELINE AND MILESTONES

Deliverables (D) and Milestones (M)		No. of weeks following contract signature (13.04.21)	Actual date
M1	Kick off meeting	1-2	05.05.21
D1	Minutes if kick off meeting including inception report	2	12.05.21
M2	Status meeting	5	
M3	Status meeting 2 (optional)	9	
M4	Status meeting 3(optional)	14	
D2	Draft report (incl. full draft for both restriction report text & standalone report)	16	
M5	Meeting to discuss draft report	18-20	
D3	Final report (restriction report text and standalone report)	22-24	10.10.2021

Task / Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
WP1																								
WP2																								
WP3																								

COMMUNICATION

- Contact point for administrative questions: [REDACTED] and cc [REDACTED]
- Contact point for information exchange: whole project team using email distribution list [REDACTED]
[REDACTED]
- Ramboll can also create a Sharepoint solution

AOB

Bright
ideas.
Sustainable
change.

