Conceptual Framework in the EU Project:

SOLUTIONS

for present and future emerging pollutants in land and water resources management

Eva Brorström-Lundén and John Munthe
IVL Swedish Environmental Research Institute

solutions

SOLUTIONS for present and future emerging pollutants in land and water resources management

Coordinator: Werner Brack, UFZ, Leipzig

and more than 100 scientists from 39 institutions

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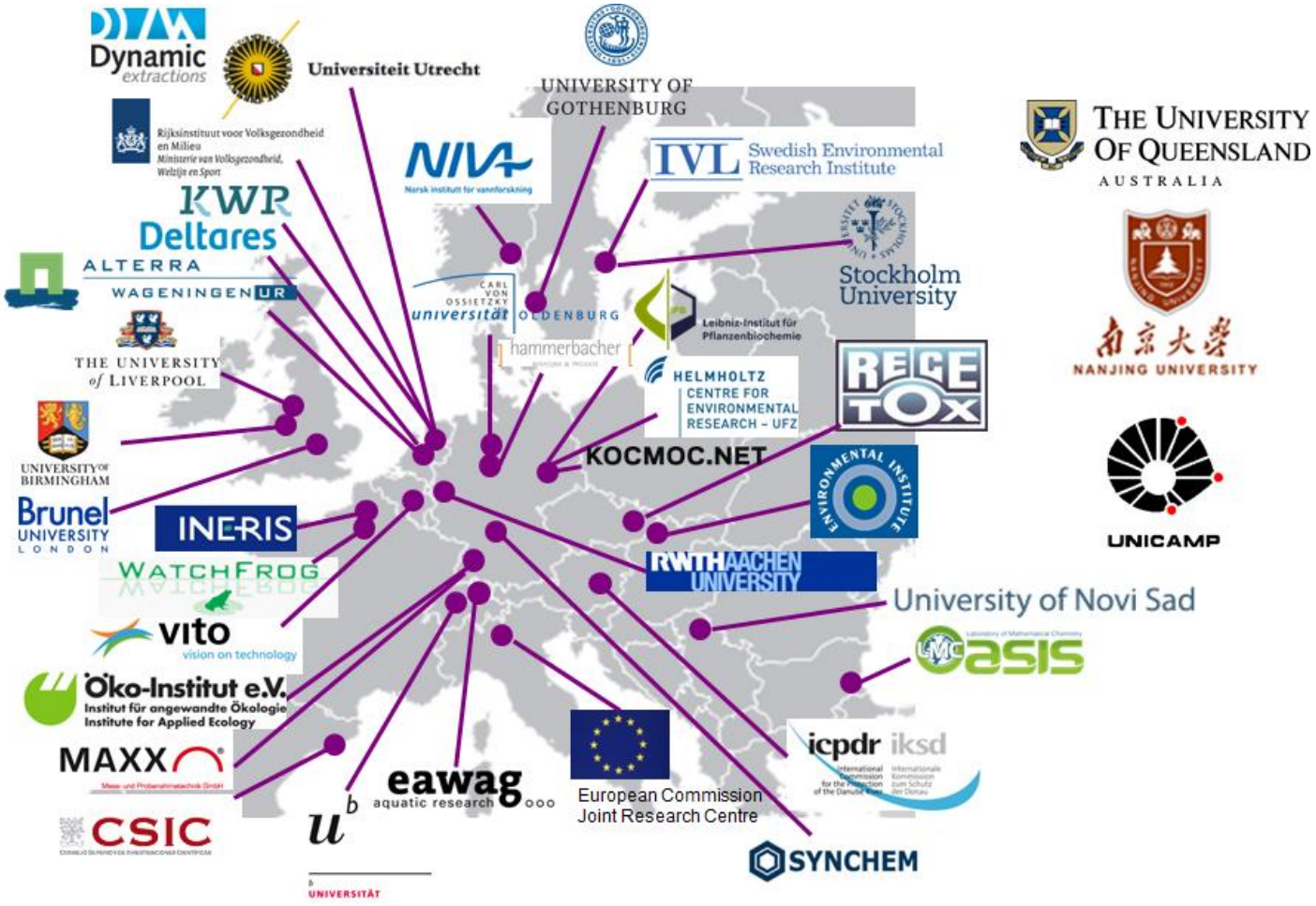

Total budget: 12 mEuro

Start: 1.10.2013

Duration: 5 years

Coordinator: Werner Brack, UFZ, Leipzig

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Where are we today?

Chemosphere

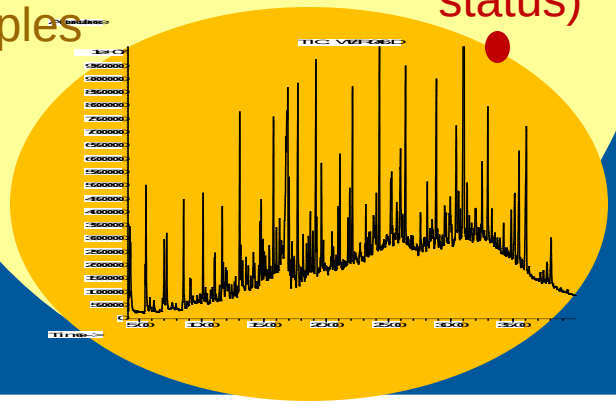
70 mio known chemicals

14 mio commercially available

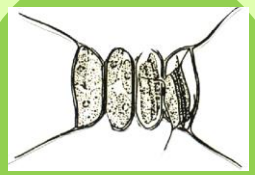
> 100.000 in daily use

41 priority pollutants (chemical status)

> 10.000 compounds in environmental samples



Ecosystem



algae

Biological Quality Elements (BQEs) + accompanying factors

invertebrates

fish

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Where do we want to go?

Chemosphere

Ecosystem

Objectives of SOLUTIONS:

- Conceptual framework for prioritisation, assessment and abatement of pollutants (eco and human health)
- Efficient tools for identification of substances and mixtures posing a risk (e.g. River Basin Specific Pollutants, RBSPs):
  - effect-based and analytical tools for early detection and identification
  - integrated models and databases for risk modelling exploiting data from chemical authorisation (e.g. REACH) and monitoring
- Demonstration in trans-European case studies (Danube, Rhine, Iberian Peninsula)

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Where do we want to go?

Chemosphere

Ecosystem

Products:

- Solutions for prioritisation, assessment and management of emerging pollutants:
  - user-friendly guidelines, computer tools and recommendations
  - abatement options in waste and drinking water management
  - common knowledge base on a wide range of toxicants
  - scenarios and solutions for upcoming risks
  - potential opportunities and obstacles for cooperation of WFD with other policies

Why do we call it SOLUTIONS?

Solutions-oriented approach:

consider management options in every step

Conventional	Solutions-oriented	
problems due to contamination? assessment required?	abatement options? assessment to evaluate options?	Problem formulation
adverse effects? dose-response? exposure? risks?	benefits and risks of options?	Risk assessment
abatement options? cost/benefit?	relative benefits, costs, impacts of options?	Risk management

Solutions project structure

Coordinator: Werner Brack, UFZ, Leipzig

Helmholtz Centre for Environmental Research GmbH, UFZ

SP1: Concepts and solutions

Lead IVL Swedish Environmental Research Institute

John Munthe, Eva Brorström-Lundén

SP2: Tools

Lead UZF *Rolf Altenburger*

SP3 : Models

Lead Deltares, *Jos van Gil*

SP4 Cases:

Lead EI, *Jaroslav Slobodnik,*

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Project structure

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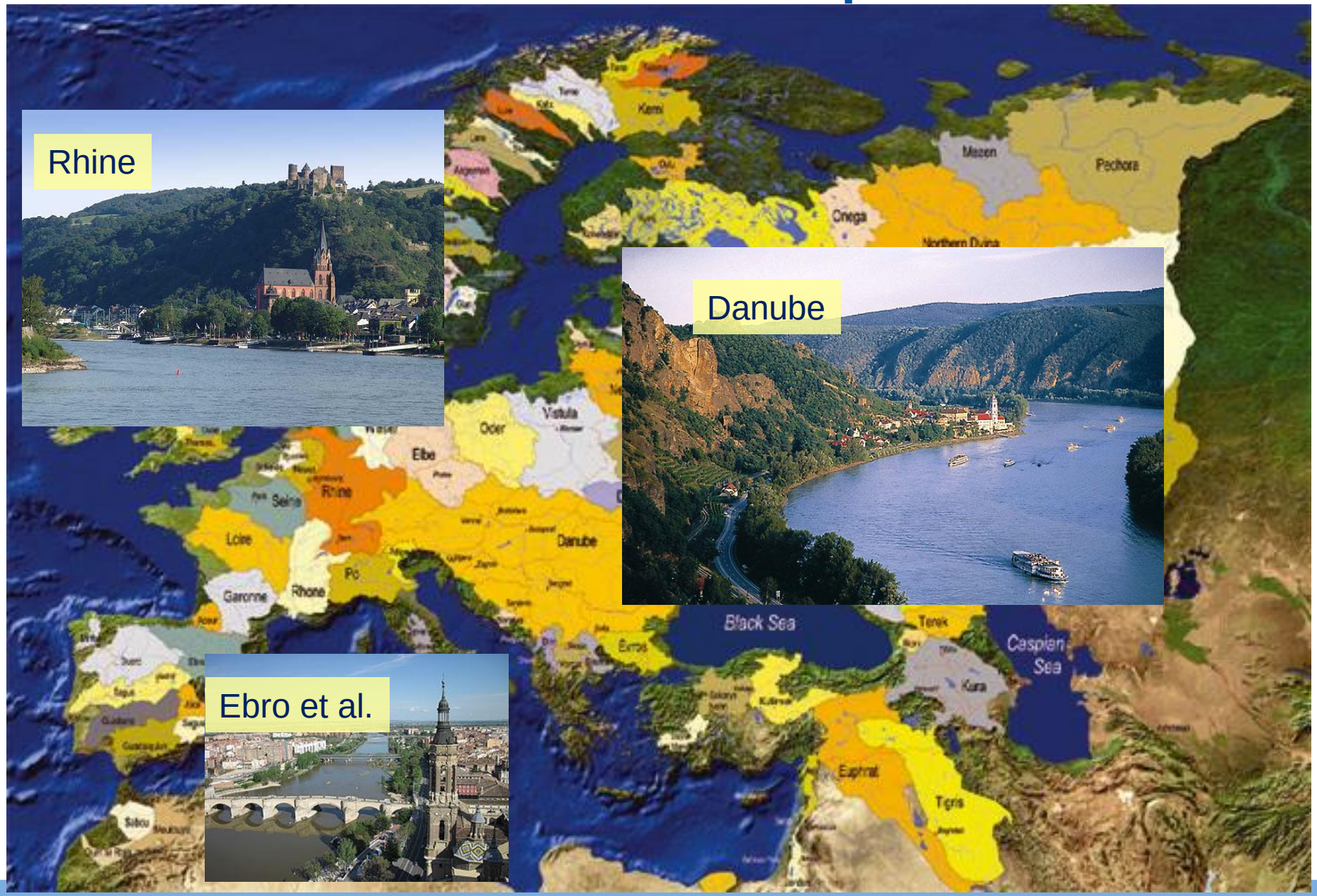
Demonstration in trans-European case studies



SP 1 Concepts & Solutions

Conceptual framework and integration of concepts and solutions

“Solutions-oriented“ approach:
Parallel assessment of risks and “solutions“: emissions, fate, effects and possible control measures (technical, substitution, policies)

Abatement and innovative toxicants management

Stakeholder dialogue

specification and prioritisation of stakeholder requirements

RiBaTox Web-based Decision Support System for River Basin specific Toxicants and solutions guidelines

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Conceptual framework for prioritisation, assessment and abatement of pollutants (eco and human health)

A conceptual framework

A common structure for all activities in SOLUTIONS
For linking scientific disciplines – measurements, modelling,effects
For linking science to decision making
The basis for decision support system RiBaTox

The conceptual framework

Should integrate all parts of the project and will be based on inputs from the research performed in SP Tools and SP models and SP Cases

Should be a guiding document for defining aims, science tasks and expected results in relation to stakeholder needs

The framework needs to be flexible and adaptable to individual problems and will be reviewed and updated on a regular basis

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Conceptual framework and integration of concepts and solutions

Stakeholder dialogue

specification and prioritisation of stakeholder requirements

What do decision makers need?

In addition to the relations between WPs, the stakeholder input is highly important.

We have to be able to explain our conceptual framework and modify it in relation to stakeholder requirements and needs.

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Conceptual framework for prioritisation, assessment and abatement of pollutants (eco and human health)

The first layer of the conceptual framework

The four key issues

How to identify and prioritise hazardous chemicals/mixtures on a basin and European scale?

How to select abatement options to achieve an environmental status safe for ecosystem and human health?

How to support decisions for minimizing hazardous emerging chemicals?

How to predict, prioritize and minimize chemical risks of possible future developments?

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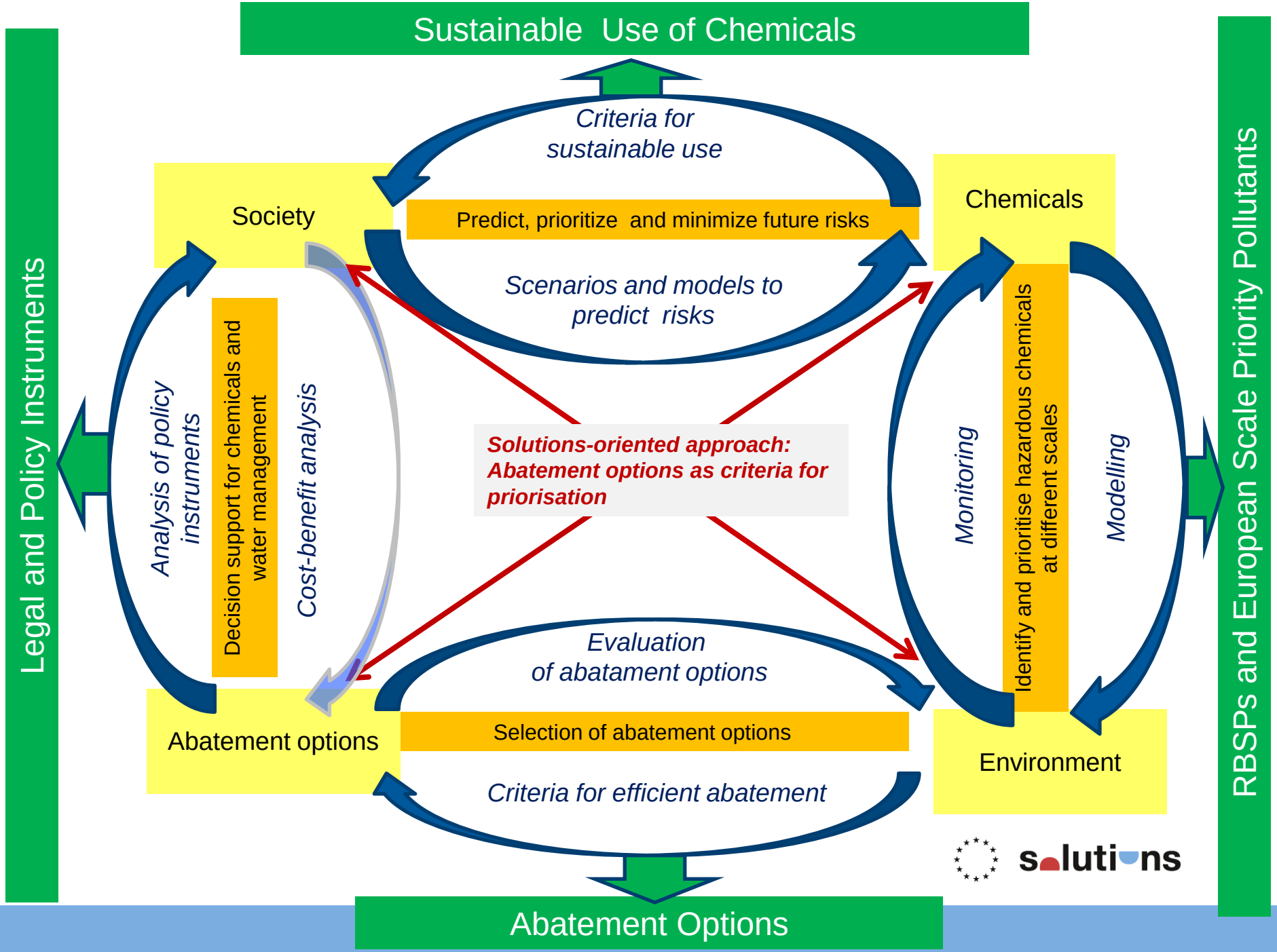
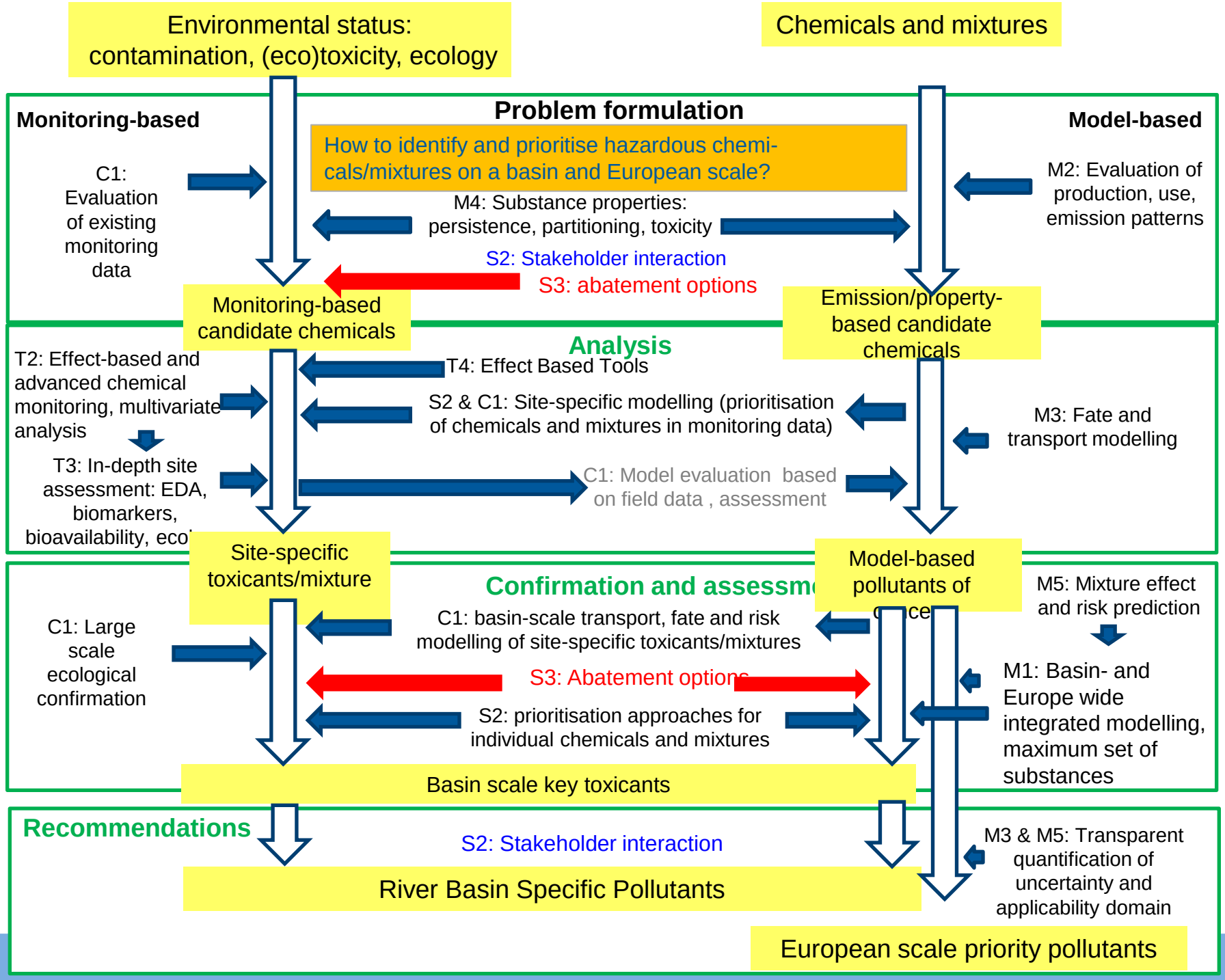
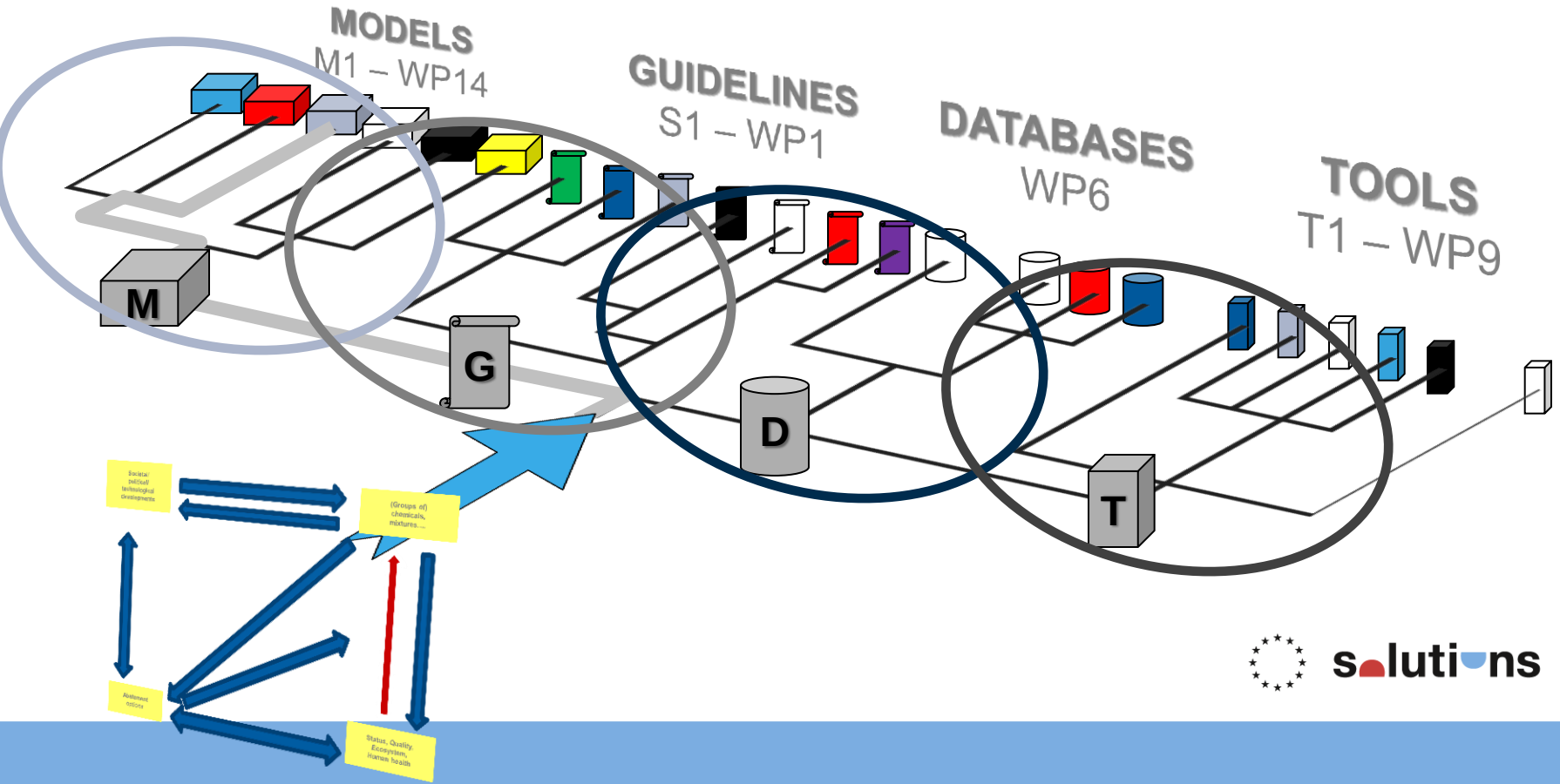

Sustainable Use of Chemicals
Legal and Policy Instruments
RBSPs and European Scale Priority Pollutants
Criteria for sustainable use
Society
Predict, prioritize and minimize future risks
Chemicals
Scenarios and models to predict risks
Analysis of policy instruments
Decision support for chemicals and water management
Cost-benefit analysis
Solutions-oriented approach: Abatement options as criteria for priorisation
Monitoring
Identify and prioritise hazardous chemicals at different scales
Modelling
Evaluation of abatament options
Abatement options
Selection of abatement options
Environment
Criteria for efficient abatement
solutions
Abatement Options


Environmental status: contamination, (eco)toxicity, ecology
Chemicals and mixtures
Monitoring-based
Problem formulation
Model-based
How to identify and prioritise hazardous chemicals/mixtures on a basin and European scale?
C1: Evaluation of existing monitoring data
M2: Evaluation of production, use, emission patterns
M4: Substance properties: persistence, partitioning, toxicity
S2: Stakeholder interaction
S3: abatement options
Monitoring-based candidate chemicals
Emission/property-based candidate chemicals
Analysis
T2: Effect-based and advanced chemical monitoring, multivariate analysis
T4: Effect Based Tools
S2 & C1: Site-specific modelling (prioritisation of chemicals and mixtures in monitoring data)
M3: Fate and transport modelling
T3: In-depth site assessment: EDA, biomarkers, bioavailability, eco
C1: Model evaluation based on field data , assessment
Site-specific toxicants/mixture
Model-based pollutants of
Confirmation and assessm
M5: Mixture effect and risk prediction
C1: Large scale ecological confirmation
C1: basin-scale transport, fate and risk modelling of site-specific toxicants/mixtures
S3: Abatement options
M1: Basin- and Europe wide integrated modelling, maximum set of substances
S2: prioritisation approaches for individual chemicals and mixtures
Basin scale key toxicants
Recommendations
S2: Stakeholder interaction
M3 & M5: Transparent quantification of uncertainty and applicability domain
River Basin Specific Pollutants
European scale priority pollutants

RiBaTox Web-based Decision Support System for River Basin specific Toxicants and solutions guidelines

the Science-Policy Interface (SPI) to the products generated in SOLUTIONS (developed by VITO)



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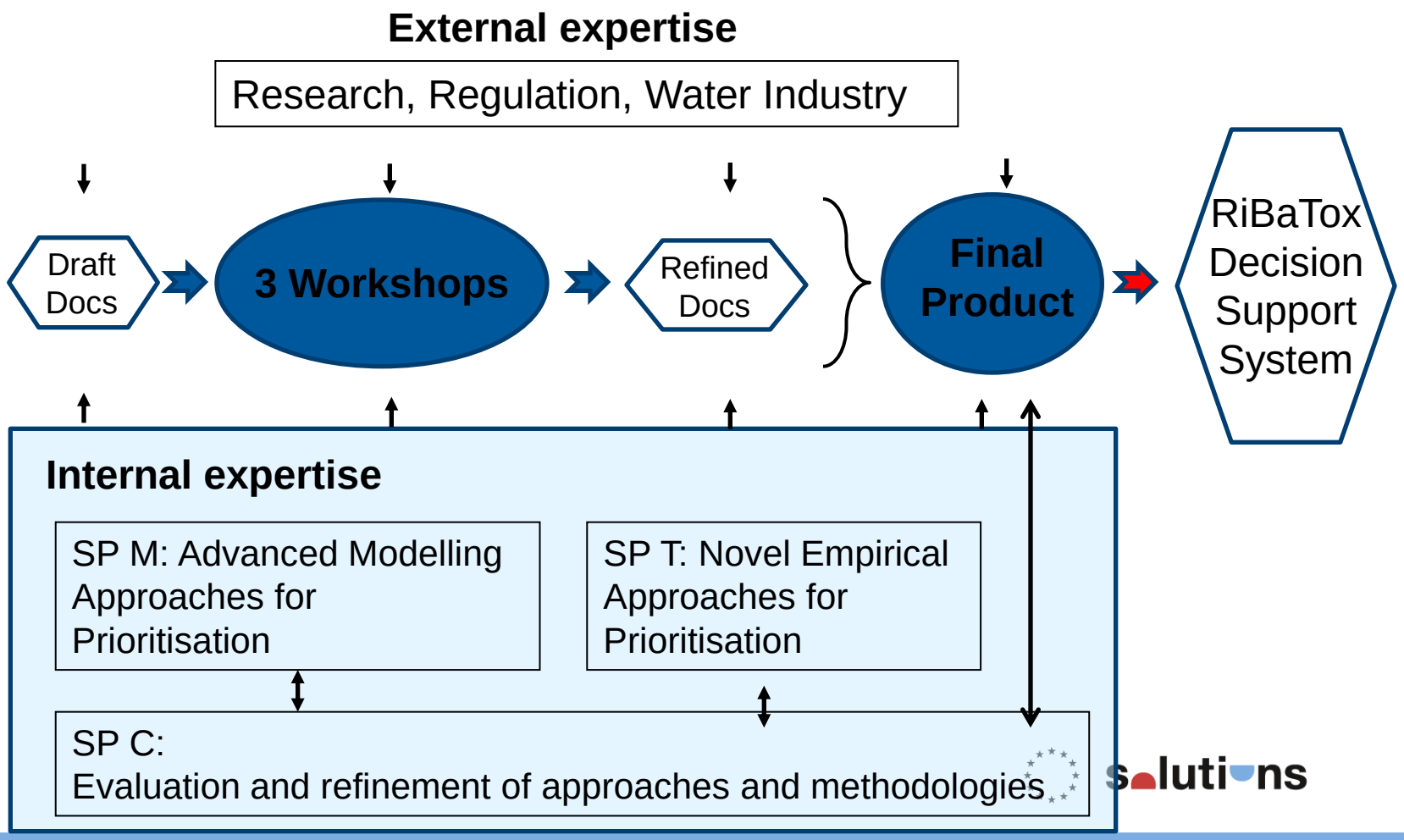
Advanced methodology for the prioritisation of contaminants and contaminant mixtures in the aquatic environment: An Integration and Coordination Activity *(Michael Faust F+B Environmental Consulting)*



Think Tank

Öko-Institut e.V.
Institut für angewandte Ökologie
Institute for Applied Ecology

Pollution of tomorrow: what can we expect?.....

Trends and Scenarios; Think tank "

Pollution of tomorrow and options to act"

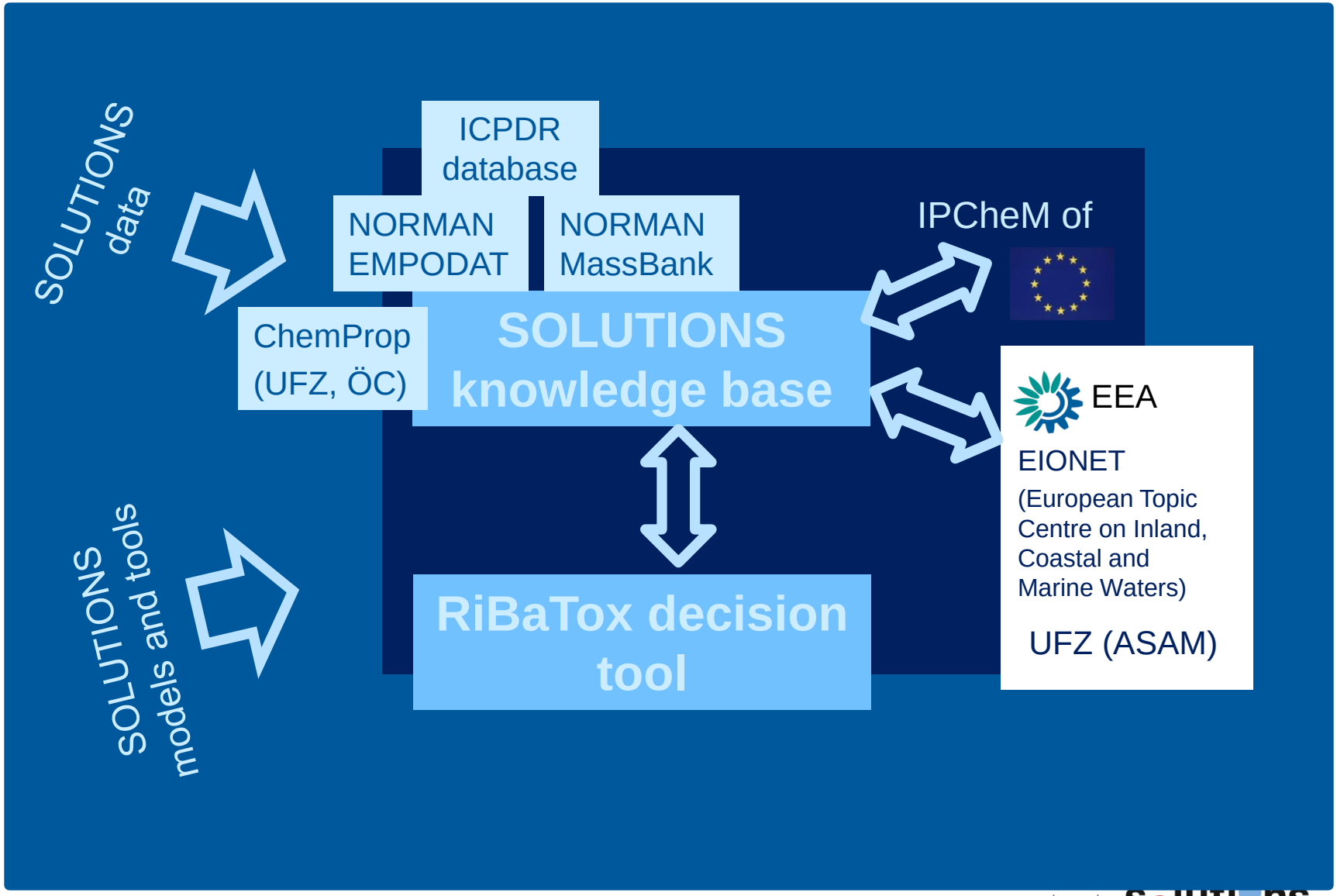
Solutions for future pollution

⇒ chemical scenarios

How does future pollution look like?

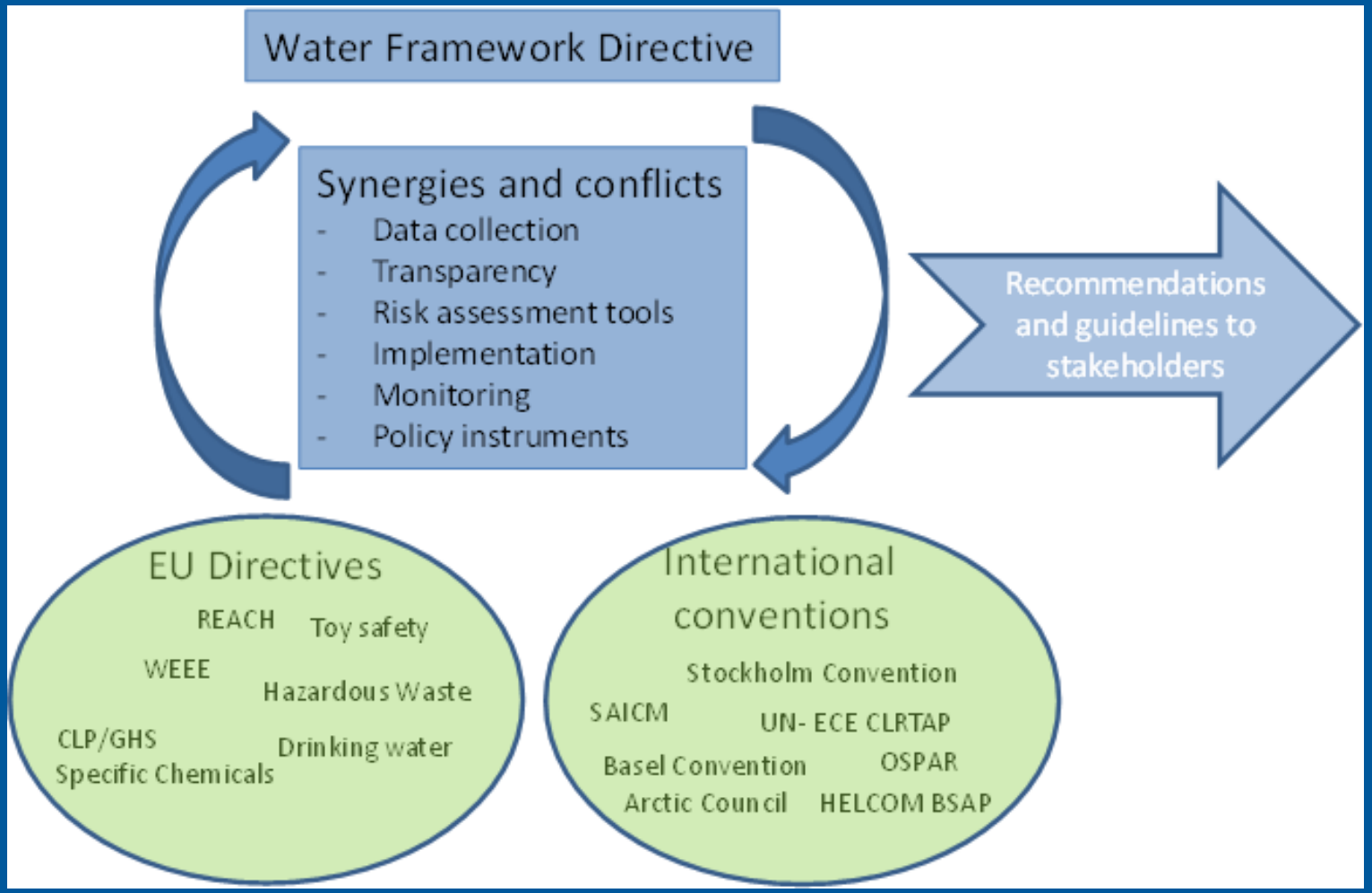
How can new pollutants be managed

SOLUTIONS data and knowledge



Political solutions for emerging pollutants

Policy evaluation



SOLUTIONS dissemination

Umwelt Bundes Amt – Für Mensch und Umwelt
Environment Canada
United States Environmental Protection Agency
VEOLIA ENVIRONNEMENT
IAWD
IAWR
EUREAU

Stakeholder Board ⟷ **Science Policy Interfacing Networks**

EEA
KEMI – Swedish Chemicals Agency
ECHA – European Chemicals Agency
DG Environment
icpdr – International Commission for the Protection of the Danube River
iksd – Internationale Kommission zum Schutz der Donau
IKSR CIPR ICBR
nrman

SOLUTIONS

hammerbacher – BERATUNG & PROJEKTE
professional moderation

KOCMOC.NET
interactive webside
professional webdesign

Case Study Panels
Danube, Rhine, Spain

General Public

Exchange with other projects
(common sampling sites, webside links, advisory board)

Prepared – enabling change
PHARMAS
SCARCE
FP7 ENV.2013.6.2-1
(multiple stress)
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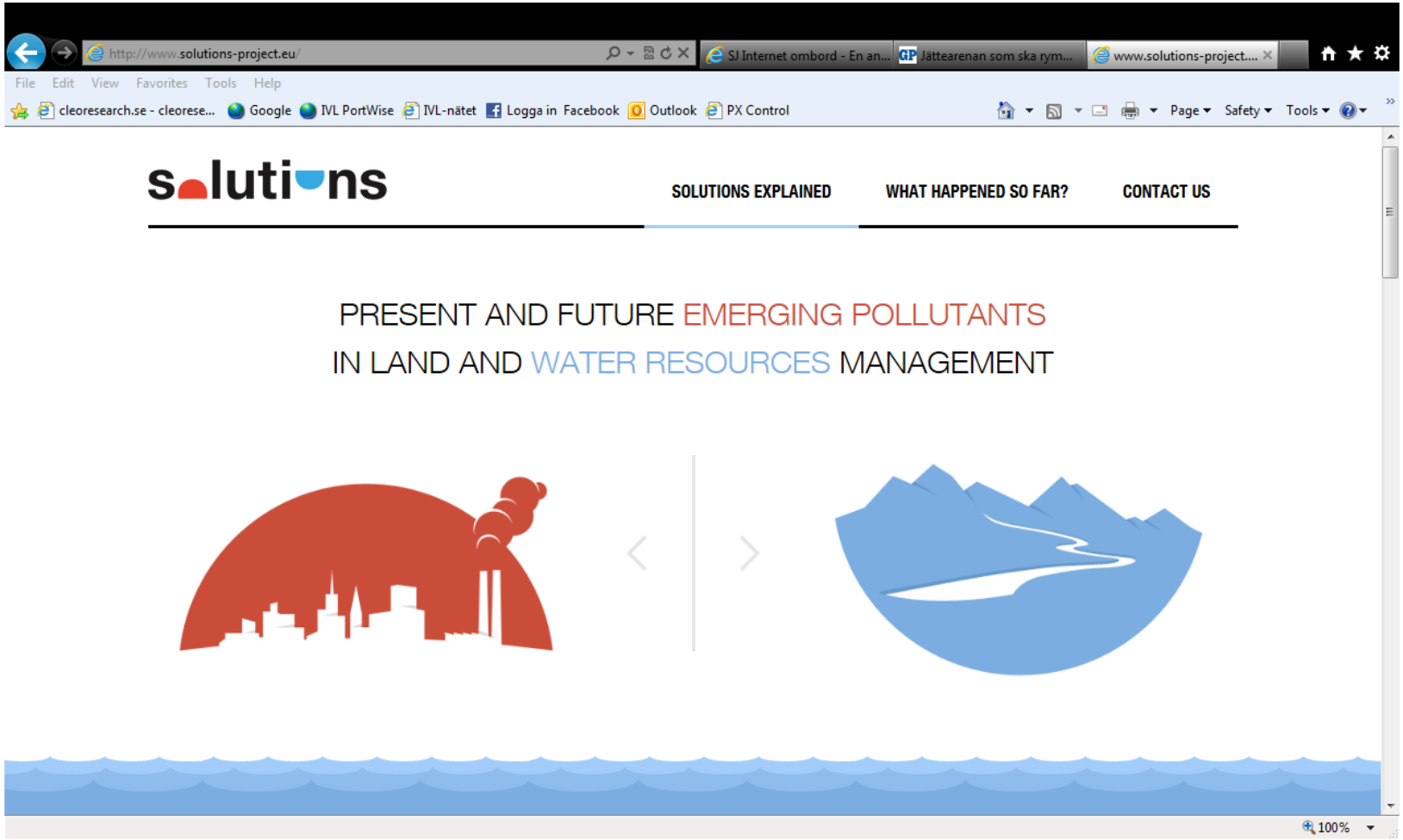
http://www.solutions-project.eu/



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Thanks for your attention!

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JRC
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Rijksinstituut voor Volksgezondheid en Milieu
Ministerie van Volksgezondheid, Welzijn en Sport
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KWR
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THE UNIVERSITY of LIVERPOOL
Dynamic extractions
UNIVERSITY OF GOTHENBURG
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WATCHFROG
THE UNIVERSITY OF QUEENSLAND AUSTRALIA
eawag aquatic research
NIVA Norsk institutt for vannforskning
Brunel UNIVERSITY LONDON
ALTERRA WAGENINGEN UR
RECETOX
RWTH AACHEN UNIVERSITY
UNIVERSITY OF BIRMINGHAM
LMC Laboratory of Mathematical Chemistry
Stockholm University
NANJING UNIVERSITY
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