



WORKSHOP ON TRANSFORMING RESEARCH RESULTS INTO INNOVATION UPTAKES

inspiring change

EUROPEAN WATER ASSOCIATION



- Independent non-governmental and non-profit making organisation dealing with the management and improvement of the water environment.
- about 23 European national associations each representing professionals and technicians
- 55 000 individuals as members
- Johannes Lohaus**, Secretary General, EWA

inspiring change

Corporate Membership

Corporate Membership is open to appropriate commercial, profit-making and other organizations involved in the water sector. Corporate members are invited as guests to the EWA Council meetings.

- Corporate members can use the opportunity to participate with reduced registration fees in the EWA high-focused conferences and workshops on European water issues
- Get your organization known by representing it on the EWA website as well as presenting your company profile in the EWA Yearbook (bi-annual publication)
- Receive information about the activities of the European Commission and other European Institutions on water policy legislation
- Contacts with the European Commission (DG Environment and Research) and the European Environment Agency

Membership fee
Corporate Member: 964 EUR

Research Membership

Get the opportunity to know and create partnerships for EU innovation and research projects with other European research and industrial institutions, if necessary, under the umbrella of EWA

- Be integrated EWA activities at each biennial IFAT Environmental Trade Fair in Munich, DE (Symposium, booth, University Challenge etc.)
- Be a guest at the yearly EWA Council meeting
- Join all EWA Symposia, Conferences and Workshops at a reduced price
- Get the opportunity to present research work at the international/European levels of the different EWA Symposia/Conferences/Workshops with a potential significant impact
- Use the EWA platform for your European connections

Membership fee
Research Member: 261 EUR

inspiring change

MODERATOR



- Harsha Ratnaweera
- Professor in Water Technology, Norwegian University of Life Sciences
- Founder and Chairman of the DOSCON Co LTD, (Innovative process surveillance and control)
- Director of the board, IWA
- IWA Fellow
- Management Council member, EWA- European Water Association

inspiring change

TRANSFORMING RESEARCH RESULTS INTO INNOVATION UPTAKES



The challenge:

To achieve the changing and demanding goals of the water sector, our research community is carrying out intensive and comprehensive R&D. However, our task is not complete until these innovations are implemented in practice. Notably, the water sector is quite slow on innovation uptakes compared with most other sectors.



inspiring change

EUROPEAN OBESREVATIONS



- Lack of funds for SMEs
- Risk aversion of the water sector
- Lack of demonstration sites
- Inconsistency and fragmentation of policies and regulations
- Water authorities and water sector fragmentation
- Conservative procurement

inspiring change

OBJECTIVES OF THE WORKSHOP



- Identify the bottlenecks in the innovation uptake process,
- Share experience on tools, incentives and processes, practices
- Consolidate guidelines of good practices accelerating the innovation uptake



inspiring change

AGENDA



Part-I: Opening and Introduction: moderator Harsha Ratnaweera, EWA/NMBU, Norway

- From research, development and innovation to implementation, Harsha Ratnaweera, EWA/NMBU
- Introduction to the digital brainstorming tool - Zakhar Maletskyi, NMBU
- Lessons learned** during uptake of innovations by water utilities: bottlenecks, paths to overcome challenges, motivating utilities for faster uptake
 - The need for and challenges in implementing innovations at utilities, Wendy Francken, VLARIO, Belgium:
 - Implementing innovations in large utility organisations, Sudhir Murthy, NEWHub, USA:
 - The path to becoming a global innovation provider, Ashish Sahu, Cambi, Norway:
 - Research collaborations leading to faster uptake, Thomas Wintgens, RWTH, Germany.

Part-II: Brainstorming and the Way Forward, moderator Wendy Francken, EWA/VLARIO, Belgium

- Comments, questions to the panel and answers**, 15 mins
- Prioritising ideas**, moderator Zakhar Maletskyi, NMBU, 10 mins
- The way forward**: reflections from the panel, 15 mins
- Conclusions and closure**

inspiring change

AGENDA



Part-I: Opening and Introduction: moderator Harsha Ratnaweera, EWA/NMBU, Norway

- From research, development and innovation to implementation, Harsha Ratnaweera, EWA/NMBU
- Introduction to the digital brainstorming tool - Zakhar Maletskyi, NMBU
- Lessons learned** during uptake of innovations by water utilities: bottlenecks, paths to overcome challenges, motivating utilities for faster uptake
 - The need for and challenges in implementing innovations at utilities, Wendy Francken, VLARIO, Belgium:
 - Implementing innovations in large utility organisations, Sudhir Murthy, NEWHub, USA:
 - The path to becoming a global innovation provider, Ashish Sahu, Cambi, Norway:
 - Research collaborations leading to faster uptake, Thomas Wintgens, RWTH, Germany.

Part-II: Brainstorming and the Way Forward, moderator Wendy Francken, EWA/VLARIO, Belgium

- Comments, questions to the panel and answers**, 15 mins
- Prioritising ideas**, moderator Zakhar Maletskyi, NMBU, 10 mins
- The way forward**: reflections from the panel, 15 mins
- Conclusions and closure**

inspiring change

MODERATOR BRAINSTORMING PROCESS

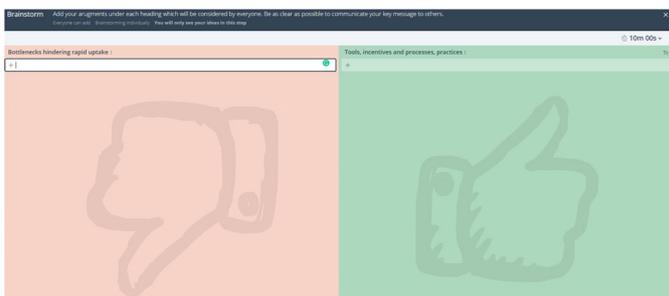


- Zakhar Maletskyi**
- Associate Professor of Water and Environmental Engineering, Norwegian University of Life Sciences
- Core expertise: separation processes
- Research interests: electrochemical processes and chemometrics in water spectroscopy
- Service: digital facilitation



inspiring change

The brainstorming tool



inspiring change

Browse to www.join.groupmap.com Invite code: 61F-A84-3F3

Connect to the brainstorming tool



- Browse to www.join.groupmap.com
- Invite code: **61F-A84-3F3**
- Direct link <https://join.groupmap.com/61F-A84-3F3>

inspiring change

Browse to www.join.groupmap.com Invite code: 61F-A84-3F3

AGENDA

Part-I: Opening and Introduction: moderator Harsha Ratnaewera, EWA/NMBU, Norway
 - From research, development and innovation to implementation, moderator Harsha Ratnaewera, EWA/NMBU
 Introduction to the digital brainstorming tool - Zakhar Maletskyi, NMBU

- **Lessons learned during uptake of innovations by water utilities: bottlenecks, paths to overcome challenges, motivating utilities for faster uptake**
 - The need for and challenges in implementing innovations at utilities, Wendy Francken, VLARIO, Belgium
 - Implementing innovations in large utility organisations, Sudhir Murthy, NEWHub, USA:
 - The path to becoming a global innovation provider, Ashish Sahu, Cambi, Norway:
 - Research collaborations leading to faster uptake, Thomas Wintgens, RWTH, Germany.

Part-II: Brainstorming and the Way Forward, moderator Wendy Francken, EWA/VLARIO, Belgium

- Comments, questions to the panel and answers, 15 mins
- Prioritising ideas, moderator Zakhar Maletskyi, NMBU, 10 mins
- The way forward: reflections from the panel, 15 mins
- Conclusions and closure

Browse to www.join.groupmap.com Invite code: 61F-A84-3F3

THE NEED FOR AND CHALLENGES IN IMPLEMENTING INNOVATIONS AT UTILITIES

WENDY FRANCKEN,
 VICE-PRESIDENT EWA/ MANAGING DIRECTOR VLARIO



CHALLENGES

- Climate mitigation : Approach causes of human driven climate change
 - Micropollutants
 - Greenhousegas (incl raw materials)
 - Chemicals



HOTSPOTS GREENHOUSE GAS (INCL RAW MATERIALS) (FLANDERS – BE)

- 20% from untreated wastewater & septic tanks
- 60% from infrastructure (sewer road infrastructure and WWTP)
- 15% from WWTP processes (operations) & sludge treatment

Source: Aquafin

POLICY GREENHOUSEGAS FOR WASTE WATER TREATMENT

- Revision Urban Waste Water Treatment Directive
- 1st legislative proposal from July – Oct 2022, final in 2024

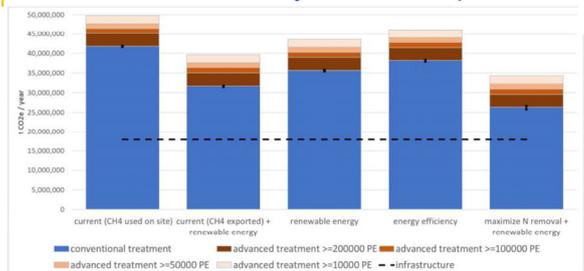
Introduction



Reduce greenhouse gas emissions

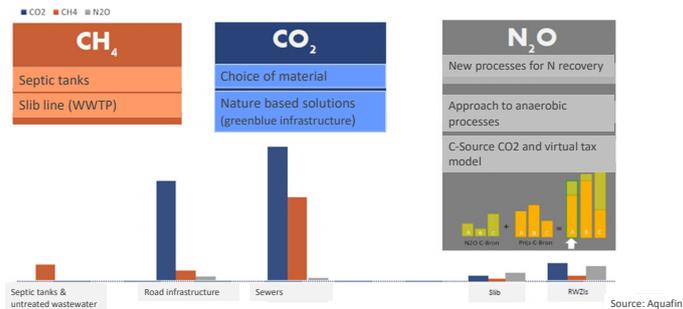
- Option 1**
 Commission to provide guidance regarding reporting of GHG emissions from treatment plants.
 Member State to decide how and to what extent treatment plants reduce GHG emissions
- Option 2**
 Member States must report to the Commission levels of GHG emissions from treatment plants.
 Member States must reduce GHG emissions to reach climate neutrality by 2050 for the sector
- Option 3**
 Member States must reach climate neutrality to reach climate neutrality
 - by 2035 for treatment plants >100 000 p.e.
 - by 2040 for the sector

Emissions of GHG by treatment plants



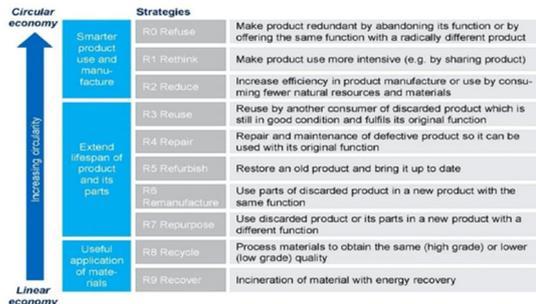
Conclusions: (1) Operational emissions can be almost halved with today's technology; (2) N removal and energy measures most important; (3) infrastructure causes high emissions; (4) more treatment requirements may offset the gains.

HOTSPOTS GREENHOUSE GAS: HOW TO MITIGATE/REDUCE FOOTPRINT?



inspiring change Browse to www.join.groupmap.com Invite code: 61F-A84-3F3 19

CHALLENGES & OPPORTUNITIES



Paradigm shift needed in the mindset of decision-makers → Create space for water instead of giving space away

inspiring change Browse to www.join.groupmap.com Invite code: 61F-A84-3F3 20

CHALLENGES & OPPORTUNITIES



Purchase of goods and services

→ Information about footprint suppliers, subcontractors, customers and partners

Waste and end-of-life management

→ Apply circularity principles.
→ LCA-based decisions.

Re-use of water

→ Quality standards
→ New techniques

Legislative innovation

→ Tender documents – not only based on price

Social innovation

→ Knowledge & capacity
→ New way of cooperation
→ Making the invisible 'visible'

Looking forward for your ideas !

inspiring change Browse to www.join.groupmap.com Invite code: 61F-A84-3F3 21

AGENDA



- Part-I: Opening and Introduction:** moderator Harsha Ratnaweera, EWA/NMBU, Norway
- From research, development and innovation to implementation, moderator Harsha Ratnaweera, EWA/NMBU
 - Introduction to the digital brainstorming tool - Zakhar Maletskiy, NMBU
- Lessons learned during uptake of innovations by water utilities: bottlenecks, paths to overcome challenges, motivating utilities for faster uptake**
- The need for and challenges in implementing innovations at utilities, Wendy Francken, VLARIO, Belgium;
 - Implementing innovations in large utility organisations, Sudhir Murthy, NEWHub, USA;
 - The path to becoming a global innovation provider, Ashish Sahu, Cambi, Norway;
 - Research collaborations leading to faster uptake, Thomas Wintgens, RWTH, Germany.

Part-II: Brainstorming and the Way Forward, moderator Wendy Francken, EWA/VLARIO, Belgium

- Comments, questions to the panel and answers, 15 mins
- Prioritising ideas, moderator Zakhar Maletskiy, NMBU, 10 mins
- The way forward: reflections from the panel, 15 mins
- Conclusions and closure

inspiring change Browse to www.join.groupmap.com Invite code: 61F-A84-3F3

SUDHIR MURTHY



- Chief Executive Officer of NEWhub Corp** (a cleantech company that specializes in managing technology and know-how for licensed distributors)
- Adjunct Senior Research Scientist at Columbia University**
- Innovations Chief for DC Water** (led the development and implementation of the Authority's innovation strategy. > 1 billion USD investment)

inspiring change Browse to www.join.groupmap.com Invite code: 61F-A84-3F3

Horizontal vs Vertical



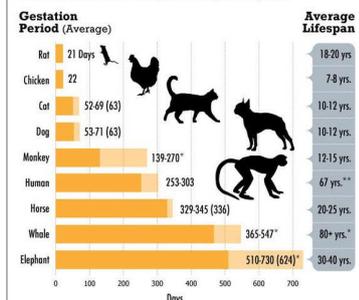
Hares (lifecycle of 5 years)	Horses (lifecycle of 20 years)	Elephants (lifecycle of >50 years)
Devices (sensors, tablets, industrial PCs, edge devices)	Mechanical Technology (mixers, aerators, scrapers, meters)	Centralized Infrastructure (systems and processes within water reclamation plants, drinking water plants, pump stations, buried infrastructure)
Analytics (controls, algorithms, machine learning)	Hydraulic/Selection Technology (pumps, screens, filters, cyclones, diffusers)	Distributed Systems (asset management, watershed management, cloud systems)

Example:
Concrete Infrastructure lasts 100 years
Mechanical Equipment lasts 20 years
Smart Sensors last 5 years

<http://www.watertechnology.com>

inspiring change Browse to www.join.groupmap.com Invite code: 61F-A84-3F3

Gestation of Technology linked to its Obsolescence



Source: R. Toro, LiveScience.com

Browse to www.join.groupmap.com Invite code: 61F-A84-3F3

Confer Functionality



Barbell Strategy
(adapted from antifragility)
by Naseem Taleb

**Intensification
Resilience
Efficiency**

**Decarbonization
Recovery,**

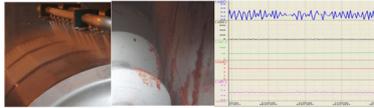
Browse to www.join.groupmap.com Invite code: 61F-A84-3F3

Sidestream Anammox



Core Equipment

- Screens and lamella for **intensification and process resilience**
- pH Control for **decarbonization and treatment efficiency**



Loading:
1 kg/m³/d

90% NH₄-N Removal,
1 kWh/kg N Removed



Browse to www.join.groupmap.com Invite code: 61F-A84-3F3

Continuous Flow Aerobic Granulation (sludge densification)



- Hydrocyclones for **intensification and resilience**
- Ammonia vs Nitrate ratio control and online SRT Management for **decarbonization and treatment efficiency**



Loading increase >30%



Treatment and Energy Efficiency >30%



Browse to www.join.groupmap.com Invite code: 61F-A84-3F3

Mainstream Deammonification

Partial Denitrification and Anammox



- Hybrid (Fixed or Moving Media) for **intensification and resilience**
- AvN and Nitrate Control for **decarbonization and efficiency**



Volume Savings >30%

Carbon Savings > 30-80%
Energy Efficiency >30%



Browse to www.join.groupmap.com Invite code: 61F-A84-3F3

Example Functional Building Blocks along Technology Horizontals



Process

- Activated Sludge



Separator

- MBR
- Decanters
- Clarifier



Physical Selector

- Hydrocyclones
- Screens



Media Selector

- MABR
- IFAS



Control

- AvN Control
- PdN Control
- pH Control

Tremendous Opportunities for Intensification, Resilience, Efficiency and Decarbonization in Existing Infrastructure

Browse to www.join.groupmap.com Invite code: 61F-A84-3F3

AGENDA

Part-I: Opening and Introduction: moderator Harsha Ratnaewera, EWA/NMBU, Norway
 - From research, development and innovation to implementation, moderator Harsha Ratnaewera, EWA/NMBU
 Introduction to the digital brainstorming tool - Zakhar Maletskiy, NMBU

Lessons learned during uptake of innovations by water utilities: bottlenecks, paths to overcome challenges, motivating utilities for faster uptake

- The need for and challenges in implementing innovations at utilities, Wendy Francken, VLARIO, Belgium:
- Implementing innovations in large utility organisations, Sudhir Murthy, NEWHub, USA:
- The path to becoming a global innovation provider, Ashish Sahu, Cambi, Norway
- Research collaborations leading to faster uptake, Thomas Wintgens, RWTH, Germany.

Part-II: Brainstorming and the Way Forward, moderator Wendy Francken, EWA/VLARIO, Belgium

- Comments, questions to the panel and answers, 15 mins
- Prioritising ideas, moderator Zakhar Maletskiy, NMBU, 10 mins
- The way forward: reflections from the panel, 15 mins
- Conclusions and closure

THE PATH TO BECOMING A GLOBAL INNOVATION PROVIDER

IWA World Water Congress & Exhibition
 11 – 15 September 2022 / Copenhagen, Denmark



Ashish K Sahu, Cambi Group, Norway

- Marketing Manager, Cambi
- Previous roles included Adjunct Faculty, Technical Director, Technology & Applications Manager, Process Engineer, Consultant, Start-up Mentor
- Board member of Norwegian Water Cluster, Society of Petroleum Engineers, International Association of Human Values
- Written and authored many peer reviewed publications, conference proceedings, white papers, technical reports, book chapters
- Academics
 - PhD in Environmental Engineering, University of Massachusetts, USA
 - Scientific Researcher, ETH-zawag, Switzerland
 - MBA from UC Berkeley, USA; IFP-Paris and BI, Norwegian Business School

A BIT ABOUT OUR INDUSTRY



IDENTIFY THE BOTTLENECKS IN THE INNOVATION UPTAKE PROCESS

- Utility
 - Demonstration is Key
 - Testimonials Matters
 - Its about the 3 Rs
- Technology Provider
 - Need for Project Development Funds
 - Building New Value Chains
 - Lack of Transparency and Regulations (esp Emerging markets)



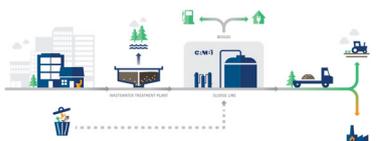
SHARE EXPERIENCE ON TOOLS, INCENTIVES AND PROCESSES, PRACTICES

VALUE CHAIN

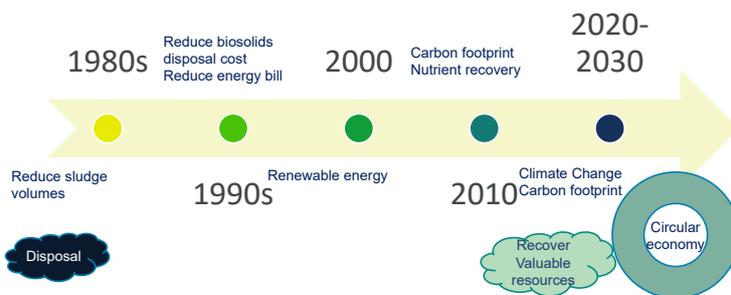
WHAT YOU REALLY NEED

VALUE NETWORK / NEXUS

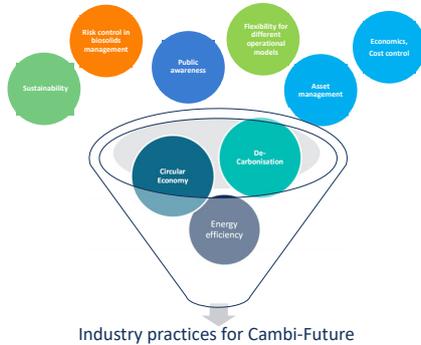
- Voice of Utilities
- Engaging Stakeholders
- Creating the Revenue Model
- Cross disciplinary approach



CHANGING DRIVERS FOR SLUDGE MANAGEMENT



ITS ALL ABOUT IDENTIFYING THE NEW DRIVERS



Industry practices for Cambi-Future

inspiring change

Browse to www.join.groupmap.com Invite code: 61F-A84-3F3

CONSOLIDATE GUIDELINES OF GOOD PRACTICES ACCELERATING THE INNOVATION UPTAKE

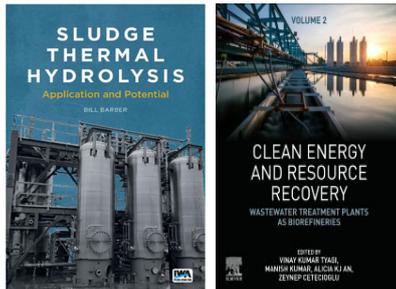


inspiring change

Browse to www.join.groupmap.com Invite code: 61F-A84-3F3



THANK YOU



Chapter 24

inspiring change

Browse to www.join.groupmap.com Invite code: 61F-A84-3F3

AGENDA



Part-I: Opening and Introduction: moderator Harsha Ratnaeweera, EWA/NMBU, Norway

- From research, development and innovation to implementation, moderator Harsha Ratnaeweera, EWA/NMBU
- Introduction to the digital brainstorming tool - Zakhar Maletskiy, NMBU

Lessons learned during uptake of innovations by water utilities: bottlenecks, paths to overcome challenges, motivating utilities for faster uptake

- The need for and challenges in implementing innovations at utilities, Wendy Francken, VLARIO, Belgium;
- Implementing innovations in large utility organisations, Sudhir Murthy, NEWHub, USA;
- The path to becoming a global innovation provider, Ashish Sahu, Cambi, Norway;
- Research collaborations leading to faster uptake, Thomas Wintgens, RWTH, Germany

Part-II: Brainstorming and the Way Forward, moderator Wendy Francken, EWA/VLARIO, Belgium

- Comments, questions to the panel and answers, 15 mins
- Prioritising ideas, moderator Zakhar Maletskiy, NMBU, 10 mins
- The way forward: reflections from the panel, 15 mins
- Conclusions and closure

inspiring change

Browse to www.join.groupmap.com Invite code: 61F-A84-3F3

RESEARCH COLLABORATIONS LEADING TO FASTER UPTAKE



- Professor in Urban Water Management since 2019
- Board member of two Tech Transfer and Testing & Verification Institutes (FiW and PIA e.V.)
- Previously Professor at University of Applied Sciences Northwestern Switzerland
- Member and contributions to different professional associations (e.g. IWA, EWA, DWA, VSA, Water Europe)
- Editor *Water Resources & Industry*
- Many research and innovation projects with different stakeholders in the water sector

Thomas Wintgens, RWTH Aachen University, Germany



inspiring change

Browse to www.join.groupmap.com Invite code: 61F-A84-3F3

WVER WASTEWATER TREATMENT PLANT AACHEN SOERS – A SITE TO INNOVATE



Photo: WVER

inspiring change

Browse to www.join.groupmap.com Invite code: 61F-A84-3F3

RESEARCH COLLABORATIONS LEADING TO FASTER UPTAKE



AGENDA

- Innovation process – The Hype Cycle
- Examples
 - SARS-CoV-2 Surveillance in wastewater
 - Micropollutant removal from municipal wastewater
 - Phosphorous recycling from wastewater or sewage sludge
- Recommendations

inspiring change Browse to www.join.groupmap.com Invite code: 61F-A84-3F3

RESEARCH COLLABORATIONS LEADING TO FASTER UPTAKE



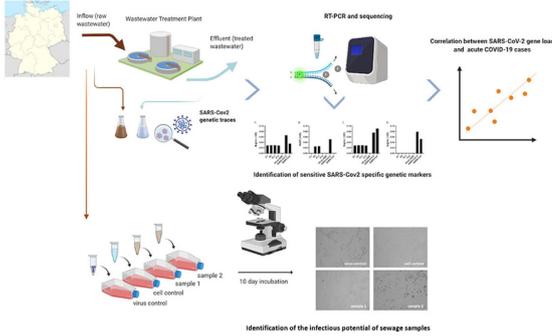
• Innovation process – Gartner's Hype Cycle



Olga Tarkovskiy (2013) on Wikipedia Commons, Illustration of Gartner Hype Cycle based on Gartner Inc.

inspiring change Browse to www.join.groupmap.com Invite code: 61F-A84-3F3

SARS-COV2-SURVEILLANCE IN WASTEWATER (WESTHAUS, WEBER ET AL., 2020)



inspiring change Browse to www.join.groupmap.com Invite code: 61F-A84-3F3



Brussels, 17.3.2021
C(2021) 1925 final

COMMISSION RECOMMENDATION

of 17.3.2021

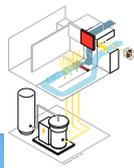
on a common approach to establish a systematic surveillance of SARS-CoV-2 and its variants in wastewaters in the EU

inspiring change Browse to www.join.groupmap.com Invite code: 61F-A84-3F3

DEMO3AC II - OZONATION OF THE WASTEWATER AT THE WWTP AACHEN-SOERS



- Aims:
 - Investigation of the effects of ozonation on water quality (micropollutant-removal) and biocenosis of the Wurm (receiving water)
 - Process optimization of the large-scale ozonation stage at the wastewater treatment plant Aachen-Soers
- Methods:
 - Intensive study of the Wurm at different seasons
 - Testing of various control and regulation strategies
 - Extensive chemical analysis and application of various bioassays
- Funding: MULNV NRW (2018-2020)
- Website: wver.de/spurenstoffe

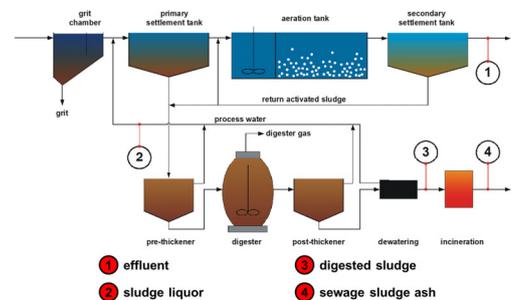


financed by
Ministerium für Umwelt, Landwirtschaft,
Natur- und Verbraucherschutz
des Landes Nordrhein-Westfalen



inspiring change Browse to www.join.groupmap.com Invite code: 61F-A84-3F3

PHOSPHOROUS RECOVERY FROM WASTEWATER AND SEWAGE SLUDGE



(Montag & Pinnekamp, ISA)

inspiring change Browse to www.join.groupmap.com Invite code: 61F-A84-3F3

RESEARCH COLLABORATIONS LEADING TO FASTER UPTAKE

- RECOMMENDATIONS -



- Problem-driven & “blue-sky” research complement each other
- Close collaboration with possible end-users and technology partners from early stage
- Testing in operational environment essential
- Fast vs. sustainable uptake
- Many factors to be considered: performance, cost, acceptance, regulations, standards, guidelines etc.

inspiring change

Browse to www.join.groupmap.com Invite code: 61F-A84-3F3

AGENDA



Part-I: Opening and Introduction: moderator Harsha Ratnaweera, EWA/NMBU, Norway

- From research, development and innovation to implementation, moderator Harsha Ratnaweera, EWA/NMBU
Introduction to the digital brainstorming tool - Zakhar Maletskyi, NMBU
- **Lessons learned** during uptake of innovations by water utilities: bottlenecks, paths to overcome challenges, motivating utilities for faster uptake
 - The need for and challenges in implementing innovations at utilities, Wendy Francken, VLARIO, Belgium:
 - Implementing innovations in large utility organisations, Sudhir Murthy, NEWHub, USA:
 - The path to becoming a global innovation provider, Ashish Sahu, Cambi, Norway:
 - Research collaborations leading to faster uptake, Thomas Wintgens, RWTH, Germany.

Part-II: Brainstorming and the Way Forward, moderator Wendy Francken, EWA/VLARIO, Belgium

- **Comments, questions to the panel and answers, 15 mins**
- **Prioritising ideas, moderator Zakhar Maletskyi, NMBU, 10 mins**
- **The way forward: reflections from the panel, 15 mins**
- **Conclusions and closure**

inspiring change

Browse to www.join.groupmap.com Invite code: 61F-A84-3F3

AGENDA



Part-I: Opening and Introduction: moderator Harsha Ratnaweera, EWA/NMBU, Norway

- From research, development and innovation to implementation, moderator Harsha Ratnaweera, EWA/NMBU
Introduction to the digital brainstorming tool - Zakhar Maletskyi, NMBU
- **Lessons learned** during uptake of innovations by water utilities: bottlenecks, paths to overcome challenges, motivating utilities for faster uptake
 - The need for and challenges in implementing innovations at utilities, Wendy Francken, VLARIO, Belgium:
 - Implementing innovations in large utility organisations, Sudhir Murthy, NEWHub, USA:
 - The path to becoming a global innovation provider, Ashish Sahu, Cambi, Norway:
 - Research collaborations leading to faster uptake, Thomas Wintgens, RWTH, Germany.

Part-II: Brainstorming and the Way forward, moderator Wendy Francken, EWA/VLARIO, Belgium

- **Comments, questions to the panel and answers, 15 mins**
- **Prioritising ideas, moderator Zakhar Maletskyi, NMBU, 10 mins**
- **The way forward: reflections from the panel, 15 mins**
- **Conclusions and closure**

inspiring change

Browse to www.join.groupmap.com Invite code: 61F-A84-3F3

AGENDA



Part-I: Opening and Introduction: moderator Harsha Ratnaweera, EWA/NMBU, Norway

- From research, development and innovation to implementation, moderator Harsha Ratnaweera, EWA/NMBU
Introduction to the digital brainstorming tool - Zakhar Maletskyi, NMBU
- **Lessons learned** during uptake of innovations by water utilities: bottlenecks, paths to overcome challenges, motivating utilities for faster uptake
 - The need for and challenges in implementing innovations at utilities, Wendy Francken, VLARIO, Belgium:
 - Implementing innovations in large utility organisations, Sudhir Murthy, NEWHub, USA:
 - The path to becoming a global innovation provider, Ashish Sahu, Cambi, Norway:
 - Research collaborations leading to faster uptake, Thomas Wintgens, RWTH, Germany.

Part-II: Brainstorming and the Way forward, moderator Wendy Francken, EWA/VLARIO, Belgium

- **Comments, questions to the panel and answers, 15 mins**
- **Prioritising ideas, moderator Zakhar Maletskyi, NMBU, 10 mins**
- **The way forward: reflections from the panel, 15 mins**
- **Conclusions and closure**

inspiring change

Browse to www.join.groupmap.com Invite code: 61F-A84-3F3

AGENDA



Part-I: Opening and Introduction: moderator Harsha Ratnaweera, EWA/NMBU, Norway

- From research, development and innovation to implementation, moderator Harsha Ratnaweera, EWA/NMBU
Introduction to the digital brainstorming tool - Zakhar Maletskyi, NMBU
- **Lessons learned** during uptake of innovations by water utilities: bottlenecks, paths to overcome challenges, motivating utilities for faster uptake
 - The need for and challenges in implementing innovations at utilities, Wendy Francken, VLARIO, Belgium:
 - Implementing innovations in large utility organisations, Sudhir Murthy, NEWHub, USA:
 - The path to becoming a global innovation provider, Ashish Sahu, Cambi, Norway:
 - Research collaborations leading to faster uptake, Thomas Wintgens, RWTH, Germany.

Part-II: Brainstorming and the Way forward, moderator Wendy Francken, EWA/VLARIO, Belgium

- **Comments, questions to the panel and answers, 15 mins**
- **Prioritising ideas, moderator Zakhar Maletskyi, NMBU, 10 mins**
- **The way forward: reflections from the panel, 15 mins**
- **Conclusions and closure**

inspiring change

Browse to www.join.groupmap.com Invite code: 61F-A84-3F3