



Market summaries for technologies on reuse of water, resource recovery and resource efficiency

Katja Wendler
DECHEMA e.V., Germany

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 - Legislation
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General EU market situation (overall UWWTP market)

- At present (2013): about **71.000 municipal wastewater treatment** plants (WWTPs) are operational in the 28 EU member states, Iceland, Norway and Switzerland
- The total treatment capacity of the WWTPs: about **775 million population equivalents**
- The EU was home to the **top four utilities** in the global market (in 2010: accounted for **32% of the global market**):
Suez (France), Veolia (France), SAUR (France) and RWE (Germany)
- The largest utilities are both the **leading W&WWT technology suppliers** and **users** of such technologies

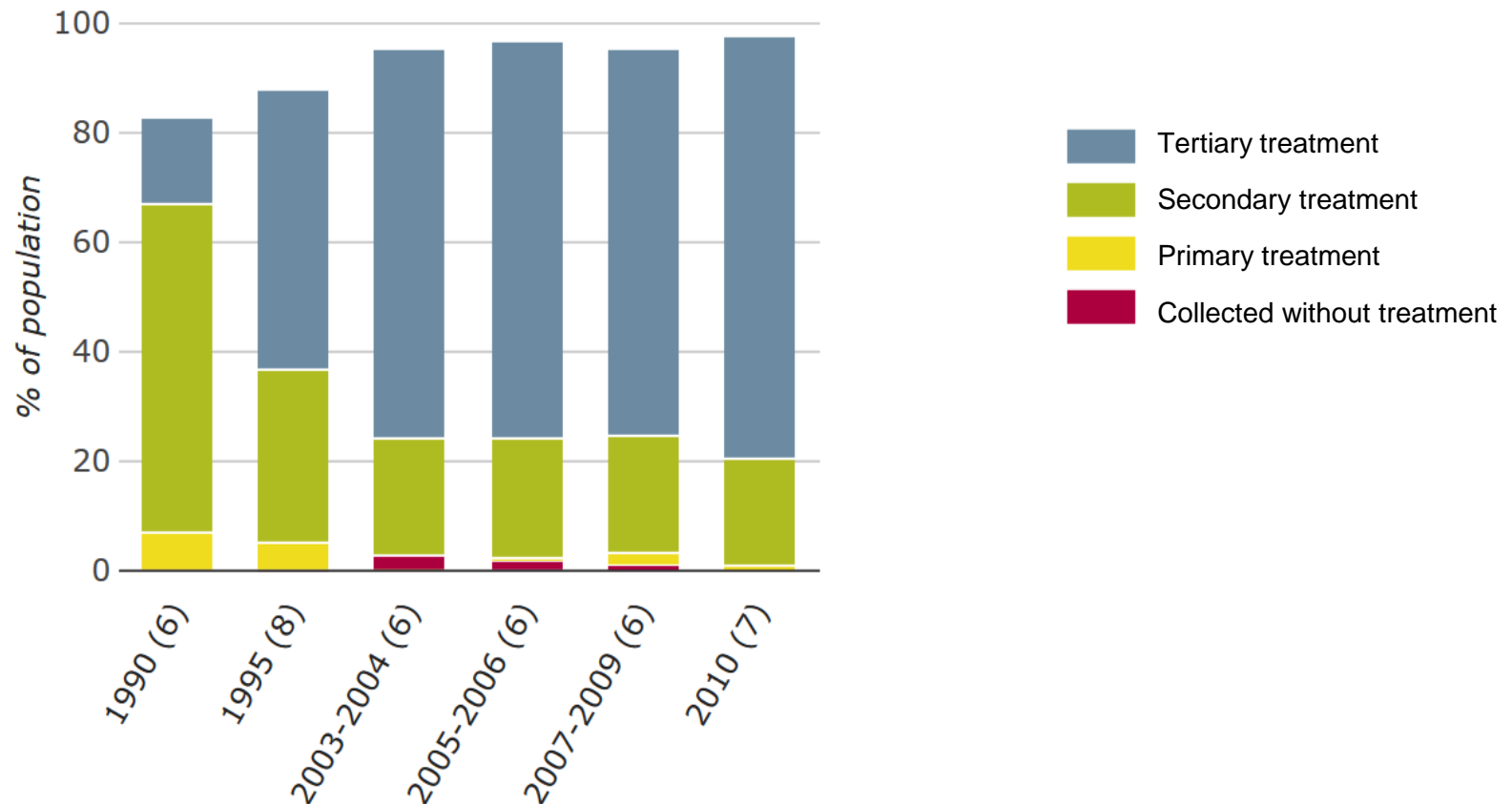
General EU market situation (overall UWWTP market)

Market **drivers** for water & wastewater treatment:

- Dominated by the **implementation of stricter regulations** and the need to **reduce energy costs** in treatment processes
→ Innovation is therefore focused on applications that will **produce higher quality water at lower costs**
- The **EU Urban Waste Water Treatment Directive** will remain the most important driving factor for **new construction** and **upgrade measures** in municipal wastewater treatment

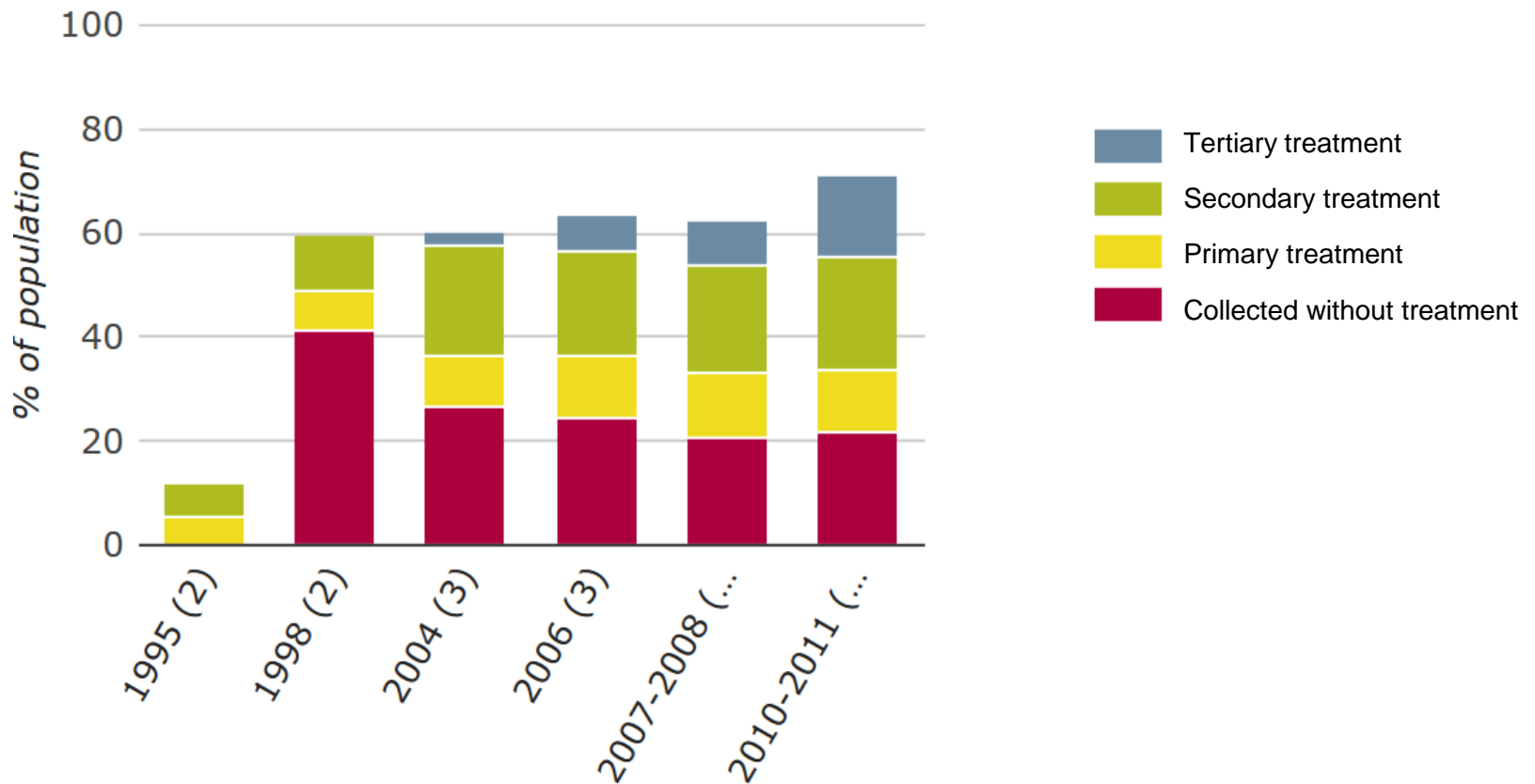
General EU market situation (overall UWWTP market)

Central – Urban wastewater treatment



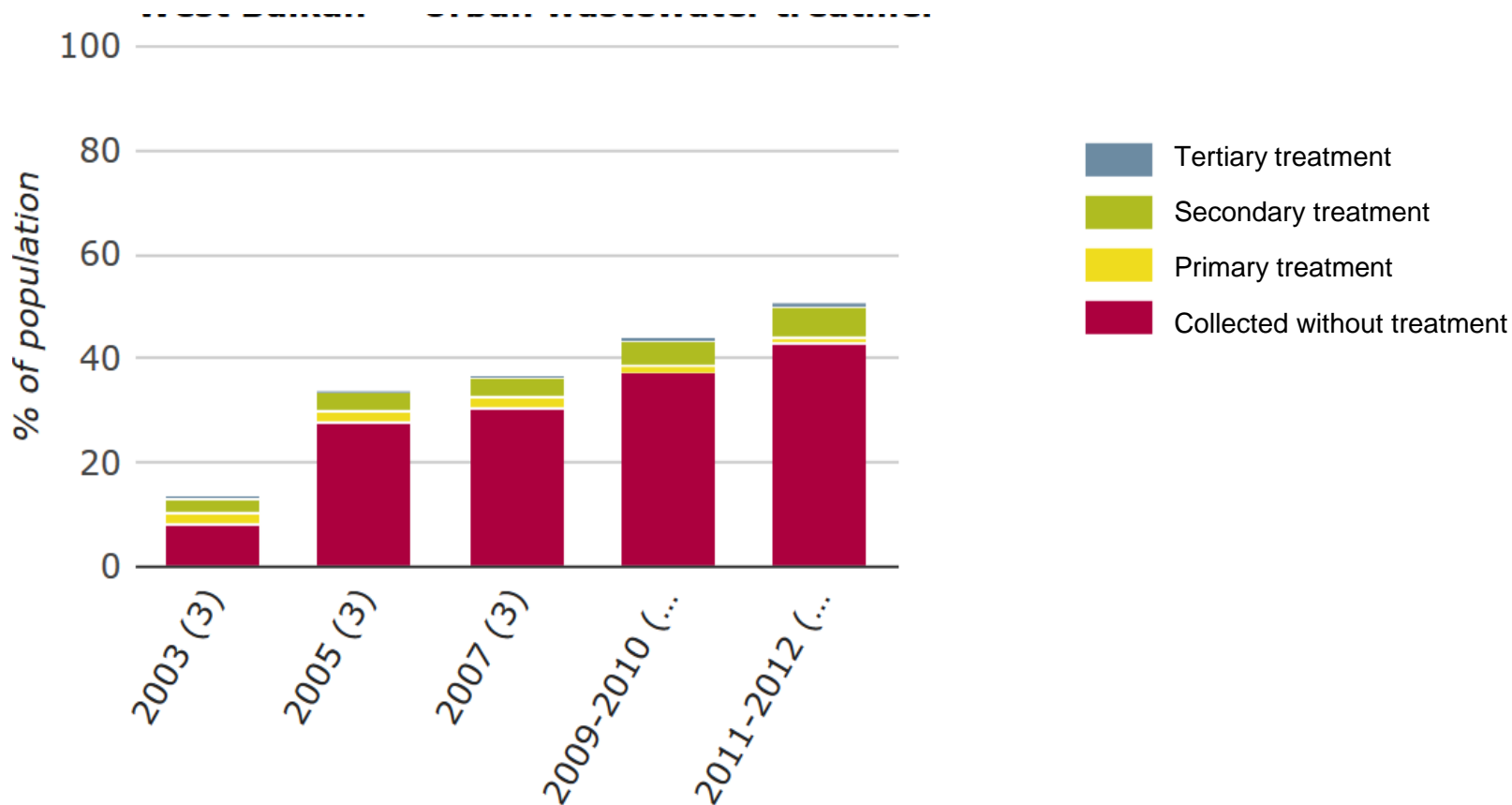
General EU market situation (overall UWWTP market)

Southern eastern – Urban wastewater treatment



General EU market situation (overall UWWTP market)

West Balkan – Urban wastewater treatment



General EU market situation (overall UWWTP market)

- In Eastern Europe:
many **new plants** constructed in medium-sized and small towns;
while already **existing plants** in large cities are equipped with biological wastewater treatment and additional treatment technology
- In countries such as Germany, the Netherlands, Scandinavia:
maintenance and renewal investments dominate
- In the 5 years to come, the experts estimate **these types of investments** to account for more than **80 % of the overall investments** in municipal WWTPs

Influencing factors

- **Legislation (EU and national)**
- **Actors (e.g. major operators) and influencers (e.g. associations)**

Water Framework Directive 2000/60/EC (WFD):

- Commits EU-Member States to achieve **good qualitative and quantitative status of all water bodies** by 2015
- The **ecological and chemical status** of surface waters are assessed according to the following criteria:
 - Biological quality (fish, benthic invertebrates, aquatic flora)
 - Hydromorphological quality (river bank structure, river continuity or substrate of the river bed)
 - Physical-chemical quality (temperature, oxygenation and nutrient conditions)
 - Chemical quality (refers to environmental quality standards for river basin specific pollutants)

Directive on urban waste water treatment 91/271/EEC (UWWTD):

- supplements WFD with an **emission-orientated approach**
- “**Key element**” of EU water policy for achieving WFD objective of good status
- **Objectives:**
 - Protect environment from adverse effects of **wastewater discharges**
 - Minimize adverse effects of **sludge disposal**
- **Scope:**
 - collection, treatment and discharge of **urban waste water**
 - treatment and discharge of waste water from **certain industrial sectors** (e.g. food-processing industry)
 - **disposal of sludge** from urban wastewater treatment

Legislation – EU

Other EU legislation with direct or indirect link to R3Water technologies:

Groundwater Directive (GWD) (2006/118/EC)

- establishes a framework to **prevent and control groundwater pollution** (e.g. by procedures for assessing the chemical status of groundwater and measures to reduce levels of pollutants)

Drinking Water Directive (80/778/EC revised with 98/83/EC)

- concerns the **quality of water intended for human consumption** and forms part of the regulation of Water supply and sanitation in the European Union.

Legislation - EU

Other EU legislation with direct or indirect link to R3Water technologies:

EU Sludge Directive (86/278/EEC)

- Amongst others: gives the limits of heavy metals in soil

Waste Framework Directive (2008/98/EC)

- sets the basic concepts and definitions related to waste management, such as definitions of waste, recycling, recovery;
- explains when waste ceases to be waste and becomes a secondary raw material (“**end-of-waste criteria**”), and how to distinguish between waste and by-products.

Directive on incineration of waste (2000/76/EC)

- establishes measures for **controlling, reducing and/or preventing air, water and soil pollution** caused by the incineration or co-incineration of waste, as well as the resulting risk to human health.

Legislation – national

Example Sweden:

Different regulations - depending on the **size** of the WWTP:

- **Small size** WWTPs (<200 p.e.):
only need to **inform** the municipality of their operation.
- **Medium size** WWTPs (200 – 2000 p.e.):
need to get an **authorisation** from the municipality of their operation.
- **Large scale** WWTPs (>2000 p.e.):
need to apply for **permission** from the county administrative board
Permission can then be conditioned based on e.g. which technology that is used and target effluent limits

Lag (2006:412) om allmänna vattentjänster – law on general water services:

- secures water supply and drainage if needed to protect and ensure the human health and the environment.

Legislation - national

Example Belgium:

Flemish materials programme (2012):

- sets out the concrete actions for the transition to a **sustainable resources management**;
- also refers to **resources from wastewater** as an important topic, with the vision to reuse and recycle **water, materials, nutrients and energy** from wastewater.

“Materials decree” and executive order on the sustainable management of material cycles and waste (Vlarema) (2012):

- regulates the criteria and procedure for obtaining the **end-of-waste status** for specific waste materials

→ In Belgium ‘environment’ and part of ‘energy’ are regional matters - the before mentioned information only relates to the Flemish Region

Influencing factors

- **Actors (e.g. major operators) and influencers (e.g. associations)**

Actors / operators

In Europe:

A few **multinational companies** with significant engagements across Europe (2012): Veolia (France), Suez Environment (France), Saur (France); RWE (Germany); FCC (Spain) and Sacyr (Spain)

But:

- Across Europe: trend towards **re-municipalisation** can be observed
- Nowadays (compared to the trends in the late 1990's and early 2000's): besides internationally acting companies- European market is characterised by **municipally owned operational companies and municipalities** as operators, e.g.:
 - in **Germany**: Water supply is provided by nearly 6.000 companies. The majority of them is operated by municipalities.
 - in **Sweden**: municipal wastewater treatment plants - usually owned and operated by companies under the head of municipalities, local federations or administrations

Influencers (associations)

In Europe:

WssTP (European Water Supply and Sanitation Technology Platform):

- initiated by the European Commission in 2004 for **Research and Technology Development** in the water industry
- transformed into an **independent legal entity** under Belgian Law in 2007

On national level, e.g.:

Germany: **German Association for Water, Wastewater and Waste (DWA):**

- **Politically and economically independent** organization
- Committed to the development of **secure and sustainable water and waste management**
- Main activities: preparing and updating the **DWA Set of Rules** and engaging in national and international cooperation to draft **special standards**
- **14,000 members** represent specialists and executives from municipalities, universities, engineering offices, authorities and companies

Influencers (associations)

On national level, e.g.:

Sweden: Svenskt Vatten - The Swedish Water and Wastewater Association (SWWA)

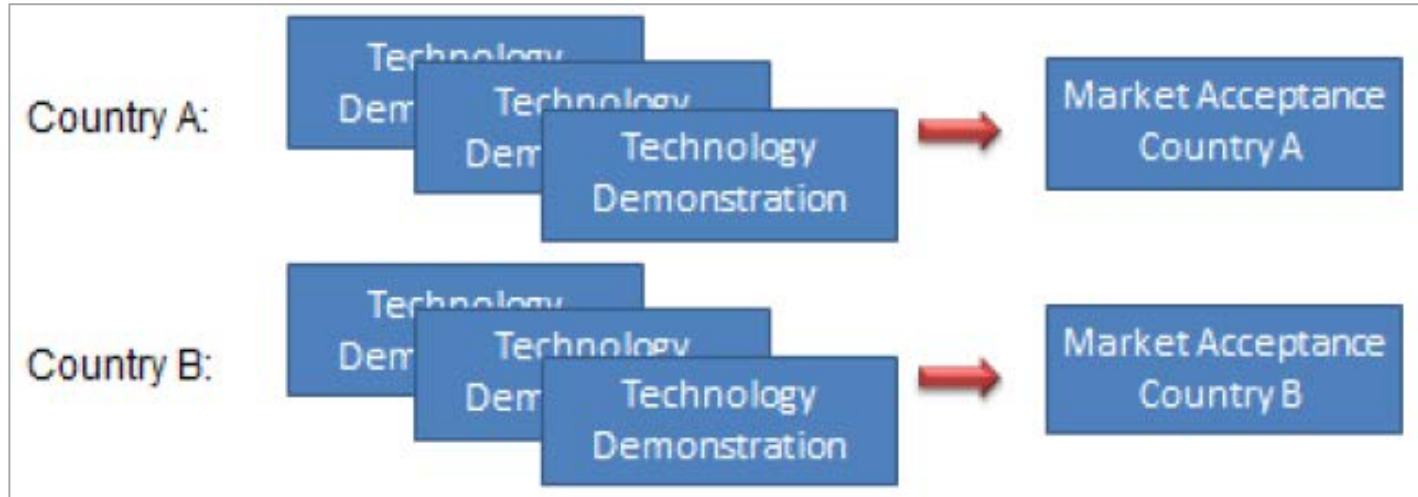
- collects and evaluates **statistical data**
- compiles **recommendations and guidelines**
- publishes a journal, newsletters and reports
- **Ad hoc working groups** with experts from member municipalities (covering the whole field of municipal water and wastewater activities)
- member of **EUREAU** (European Union of National Association of Water Supplies) and administers the national secretariat for the **IWA** (International Water Association).
- **289 municipalities** are its members (represents the national municipal units for water and wastewater)

Entry to the market

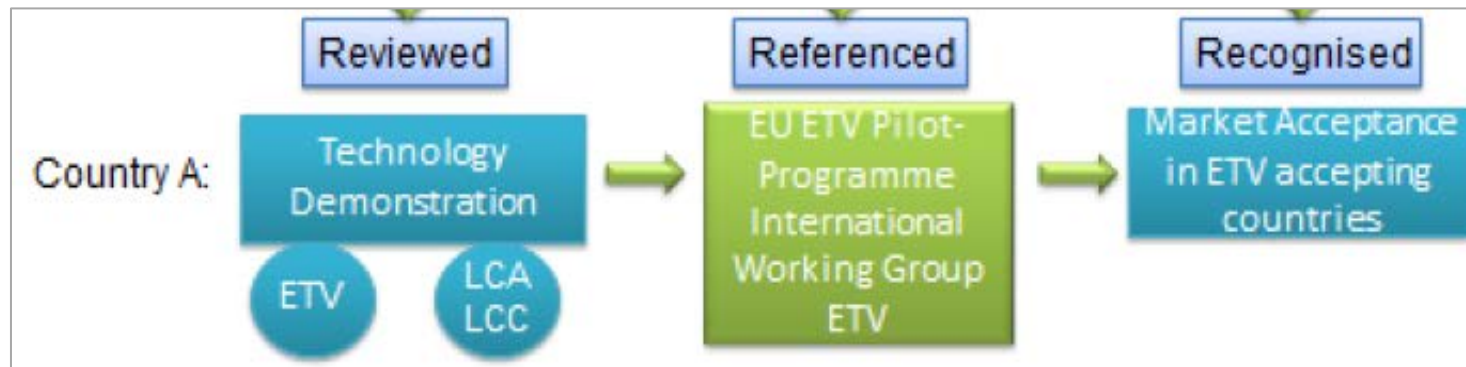
- **Environmental Technology Verification (ETV)**
- **Financing instruments (European and regional)**

Environmental Technology Verification (ETV)

Traditional demonstration and market access approach:



Innovative R3Water demonstration and market access approach:



Environmental Technology Verification (ETV)

Environmental Technology Verification (ETV):

- tool to help innovative environmental technologies **reach the market**
- Claims about the performance of innovative environmental technologies verified by **qualified third parties** called "**Verification Bodies**" (accredited under standard of ISO 17020 – so far: 13 available)
- "**Statement of Verification**" (delivered at the end of the ETV process): can be used as evidence that the claims made about the innovation are both credible and scientifically sound.
- With **proof of performance** credibly assured:
Innovations can expect
 - easier market access and/or
 - a larger market share and
 - technological risk is reduced for technology purchasers

Environmental Technology Verification (ETV)

Technology areas covered in the EU ETV Pilot Programme:



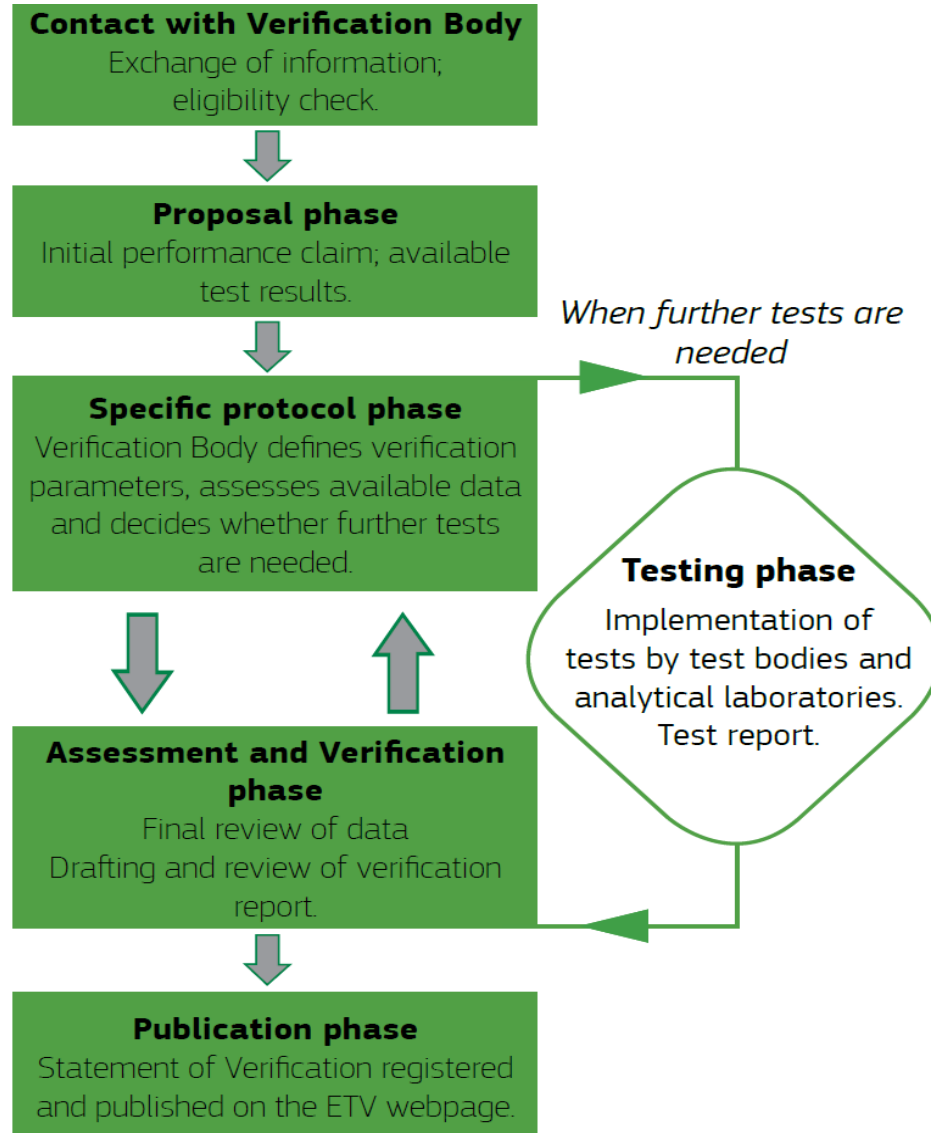
Environmental Technology Verification (ETV)

Eligibility criteria for verification under the EU ETV Pilot Programme:



Environmental Technology Verification (ETV)

Phases of the
verification
process



Environmental Technology Verification (ETV)

In R3Water:

ETV procedures (within EU ETV Pilot Programme) ongoing /starting:

- **AQUATRACK™** technology (Reuse of water)
- **Hydrothermal Carbonisation – HTC** (Resource recovery)

On international level:

- Elaboration of the **standard “ISO 14034 Environmental management - Environmental technology verification (ETV)”** in ISO/TC 207 „Environmental management“, Sub Committee 4 „Environmental Performance Evaluation“
- to support the **international recognition** of results gained within ETV

Entry to the market

Financing instruments (European and regional)

Financing instruments

On European level:

Banks:

- European Bank for Reconstruction and Development
- European Investment Bank

Funds:

- Structural, Regional Funds and Cohesion Fund
- European Regional Development Fund (ERDF)
- Rural Development Funds (EAFRD)

Research programmes:

- Horizon 2020 – The EU Framework Programme for Research and Innovation
- LIFE Projects: 2014-2020

Financing instruments

National level (example Germany):

SME – innovative: Resource efficiency and climate protection

NAWAM Sustainable Water Management

→ from BMBF - Federal Ministry of Education and Research

National operational programmes (OP) 2014 – 2020 for each “Land”

→ from European Regional Development Funds (ERDF)

Cross-border, transnational and interregional co-operation

→ from European Regional Development Funds (ERDF), e.g.

- Interreg V-A - Germany-Denmark
- Interreg V-A - France-Belgium-Germany-Luxembourg
(Grande Région/Großregion)

Conclusions

- Situation in Europe **differs**
 - From country to country
 - Related to the **actors** and **influencing associations** when they want to enter a national market
- **Legislation** sometimes poses a hurdle:
 - sometimes even **differences between the regions** in one country (Belgium: regulation applies only to the Flemish region; Germany: overarching legislation but “Länder” still have the possibility to adopt alternative provisions within a given frame)
 - e.g. procedure to get an “end-of waste” status = have a “product” – means challenges also concerning **transnational activities**;
- **ETV** supports innovative environmental technologies to reach the market
- **Financing instruments** are available (on EU and national level)



Reuse, Recovery and Resource efficiency,
Innovations in urban wastewater treatment

**Thank you very much for
your attention!**

Technologies in R3Water - SWOTs



- Reuse of water
- Resource recovery
- Resource efficiency

Introduction and scope of the market studies

Market studies in R3Water:

Carried out with special regard to the

- **European market**
- **Countries where R3Water partners are located**
(Belgium, Finland, Germany, Norway, Spain, Sweden, UK)
- **3 technology areas in R3Water**
(Reuse of water, Resource efficiency, Resource recovery)

Standardisation (example: Water reuse)

On international level :

- ISO standard 16075:2015 “Guidelines for treated wastewater use for irrigation projects” (with 4 parts)

On national level:

Country	Standards reference	Issuing institution
Cyprus	Law 106 (I) 2002 Water and Soil pollution control and associated regulations KDP 772/2003, KDP 269/2005	Ministry of Agriculture, Natural resources and Environment Water development Department (Wastewater and reuse Division)
France	JORF num.0153, 4 July 2014 Order of 2014, related to the use of water from treated urban wastewater for irrigation of crops and green areas	Ministry of Public Health Ministry of Agriculture, Food and Fisheries Ministry of Ecology, Energy and Sustainability
Greece	CMD No 145116 Measures, limits and procedures for reuse of treated wastewater	Ministry of Environment Energy and Climate Change
Italy	DM 185/2003 Technical measures for reuse of wastewater	Ministry of Environment Ministry of Agriculture, Ministry of Public Health
Portugal	NP 4434 2005 Reuse of reclaimed urban water for irrigation	Portuguese Institute for Quality
Spain	RD 1620/2007 The legal framework for the reuse of treated wastewater	Ministry of Environment Ministry of Agriculture, Food and Fisheries, Ministry of Health

Standardisation – ISO/DIS 14034 on ETV

Preliminary contents

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- 2 Normative references
- 3 Terms and definitions
- 4 General principles and requirements
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 - 4.2 Requirements
- 5 Environmental Technology Verification procedure (ETV procedure)
 - 5.1 Application for verification
 - 5.2 Pre-verification (planning)
 - 5.3 Verification
 - 5.4 Reporting
 - 5.5 Post-verification

Annex A (normative) Outline of the verification plan

Annex B (informative) Relationship between ISO 14034 and ISO/IEC 17020

Annex C (informative) Overview of the ETV standard procedure (flow-chart)

Annex D (informative) Guidance for the use of the standard

Bibliography