Office International de l'Eau

umweltbundesamt

Specific contract No 07.0307/2012/638595/D2 implementing Framework Service Contract ENV.D.2/FRA/2012/0013

URBAN WASTE WATER TREATMENT DIRECTIVE

TOWARD A NEW INFORMATION SYSTEM

SIIF

(Structured Implementation and Information Framework)

Concept Paper

Final Version

30 January 2014

Date:	30 January 2014
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This document has been produced by Umweltbundesamt GmbH and OIEau.

Table of Content

1 INTRODUCTION

1.1 Objective and scope

The current concept paper aims at informing about the background and general framework of Structured Information and Implementation Frameworks (SIIFs), as the new information system to be progressively implemented for the UWWTD in the next years. The main aim of any SIIF is to ensure the production and the online dissemination of information allowing the citizens to know the status of implementation of the Directive concerned.[1] This needs to be seen in the context of several legislative and policy developments on EU level with a particular focus on the Commission Communication COM/2012/095 on "Improving the delivery of benefits from EU environment measures: building confidence through better knowledge and responsiveness", the 7th Environmental Action Programme (EAP), the Blueprint to Safeguard Europe's Water Resources (COM(2012) 673 final) and the Commission Communication COM/2013/685 on "Regulatory Fitness and Performance (REFIT): Results and Next Steps" as outlined in section 2.

The UWWTD and its established reporting processes were selected to serve as a SIIF pilot with the objective to identify all thematic and IT relevant aspects which need to be addressed for a full implementation of an operational UWWTD SIIF. It should cover the benefits for all actors involved (see section 3). Technical options proposed will have to be further tested before finalising the UWWTD SIIF concept paper. A first roadmap for further steps ("recipe book") to be implemented by the main actors – the European Commission (EC), other EU-stakeholders such as the European Environment Agency (EEA) or EUROSTAT as well as EU-MS – is included in section 4 of the concept paper.

1.2 Addresses

The concept paper is primarily addressed to decision makers in the EC, other EU-stakeholders such as the EEA or EUROSTAT as well as EU-MS involved in the implementation of environmental acquis communautaire, and more precisely in the implementation of the UWWTD. The UWWTD SIIF pilot project started at the end of 2012, and has resulted in the identification of the main elements of the SIIF approach. This concept paper on reporting, processing and assessment of data in relation to the implementation of the UWWTD serves as a basis for discussion on the main functionalities of the UWWTD SIIF. It outlines in a clear and concise way how the UWWTD SIIF should look like from an IT and thematic perspective: a decentralised system to manage and actively disseminate data and information in relation to the mandatorily reported data needed for compliance with the UWWTD as well as voluntarily shared data for additional assessments.

The concept paper defines the overall framework for the future UWWTD SIIF. It is being complemented by pilot exercises to develop and test the core elements necessary to ease the implementation of a UWWTD SIIF in EU countries. The targeted group of the UWWTD SIIF pilot are those EU-MS with (significant) compliance gaps. Although not being the prime target of the Commission's action at the pilot stage, other EU-MS may be interested to apply the ideas as well, e.g. to ensure that they stay in compliance, and are welcome to join the exercise at any point in

[1] "Report on Phase 1 of the Pilot Exercise SIIF URBAN WASTE WATER TREATMENT DIRECTIVE".

time. Experiences gathered from the UWWTD SIIF pilot exercise may be used for other key EU environmental laws in the future.

The "Report on Phase 1 of the Pilot Exercise SIIF URBAN WASTE WATER TREATMENT DIRECTIVE" summarises the first results of discussions with EU-MS in two general workshops (December 2012 and October 2013) as well as more bilateral meetings with those four countries (Ireland, Slovenia, Lithuania and Cyprus) which have been associated as UWWTD SIIF "pilot countries". Overall it can be said that the reactions of EU-MS to the UWWTD SIIF concept, namely regarding the UWWTD reporting system, are diverse. Although accepting the need to enhance the active dissemination of implementation results, many countries do not see the need to change the current reporting system. This is mainly based on their concerns by the likely additional effort required to change the current system where they underlined the importance of the costs associated to such a transitional phase.[2]

2 GENERAL FRAMEWORK

2.1 SIIF & REFIT Communication, Environmental Action Programme and Blueprint

Structured Information and Implementation Frameworks (SIIFs) represent a new concept for reporting, processing and assessment of data in relation to the implementation of EU-Directives. SIIFs need to be seen in the context of the implementation of the Directive on public access to environmental information[3] as well as the INSPIRE[4]-Directive and decision on a General Union Environment Action Programme to 2020 and at least seven European communications[5]. Among them, the following key legislative and policy developments can be highlighted:

- The SIIF concept was initially introduced through the Commission Communication COM/2012/095 on "Improving the delivery of benefits from EU environment measures: building confidence through better knowledge and responsiveness"[6].

The Implementation Communication of 7 March 2012 describes a set of objectives around two identified key themes that currently hamper compliant implementation being a) knowledge on implementation and b) responsiveness at national, regional and local levels. The Communication introduced a number of new ideas on how to improve both facets of implementation. One of these new ideas is the "Structured Implementation and Information Frameworks" (SIIFs), which are

2 See "Report on Phase 1 of the Pilot Exercise SIIF URBAN WASTE WATER TREATMENT DIRECTIVE".

3 DIRECTIVE 2003/4/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 28 January 2003 on public access to environmental information and repealing Council Directive 90/313/EEC, available at: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2003:041:0026:0032:EN:pdf.

4 Directive 2007/2/EC of the European Parliament and of the Council of 14 March 2007 establishing an Infrastructure for Spatial Information in the European Community (INSPIRE), available at: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32007L0002:EN:NOT.

5 See more details in Annex I.

6 Communication from the Commission to the European Parliament, the Council, the European economic and social Committee and the Committee of the regions *'Improving the delivery of benefits from the EU environment measures: building confidence through better knowledge and responsiveness'* (COM/2012/095), available at: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2012:0095:FIN:EN:PDF.

intended to be developed for all key EU environmental laws. SIIFs should be designed to clarify the main provisions of a Directive as well as identify the main types of information needed to demonstrate how EU law is being implemented. SIIFs would be aimed at existing legislation and, together with initiatives under the Shared Environment Information System (SEIS), would guide the development of information systems that track implementation on the ground on a constant basis.

- Furthermore, Annex 6 of the Impact Assessment for the 7th Environmental Action Programme (EAP) Decision 1386/2013/EU[7] indicates that this approach can be tested for the Urban Waste Water Treatment Directive (Directive 91/271/EEC, UWWTD).

A new Environment Action Programme for the EU, entitled "Living well, within the limits of our planet", which will guide environment policy up to 2020 was adopted on 20th November 2013 by the Decision 1386/2013/EU of the European Council and the European Parliament. It confirms the action of the Implementation Communication under priority objective 4: "In order to maximise the benefits of Union environment legislation by improving implementation, the 7th EAP shall ensure that by 2020: "*(a) the public has access to clear information showing how Union environment law is being implemented consistent with the Aarhus Convention"*, in particular "*ensuring that systems at national level actively disseminate information about how Union environment legislation is being implemented, and complementing such information with a Union level overview of individual Member States' performance*", *"(b) compliance with specific environment legislation has increased"*, in particular "*drawing up partnership implementation agreements on a voluntary basis between Member States and the Commission, involving local and regional participation where appropriate*"."

- The Blueprint to Safeguard Europe's Water Resources (COM(2012) 673 final)[8] outlines actions that concentrate on better implementation of current water legislation, integration of water policy objectives into other policies. As for the UWWTD, the Blueprint proposes actions for the Commission and Member States to improve compliance rates on waste water treatment through long-term investment planning and implementation plans, which can be produced with the help of the UWWTD SIIF.

The Blueprint to Safeguard Europe's Water Resources aims at tackling the obstacles which hamper action to safeguard Europe's water resources and is based on an extensive evaluation of the existing policy in the field of water. Regarding the chemical status and pollution of EU waters and related problems and its solutions, the Blueprint includes the proposed action for the Commission and Member States to improve compliance rates on waste water treatment through long-term investment planning by 2018, to elaborate implementation plans (including EU funds and EIB loans) by 2014 (see table 2 under section 2.2 of the Blueprint) and to harmonise the reporting cycles under water legislation (see section 2.5 of the Blueprint).

- The Commission Communication COM/2013/685 "Regulatory Fitness and Performance (REFIT): Results and Next Steps" highlights the UWWTD SIIF pilot as an example of how

[7] http://ec.europa.eu/environment/newprg/process.htm

[8] Communication from the Commission to the European Parliament, the Council, the European economic and social Committee and the Committee of the regions "A Blueprint to Safeguard Europe's Water Resources" (COM/2012/0673 final), available at: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:52012DC0673:EN:NOT.

to identify the nature, scope and frequency of reporting obligations in legislation, and consequently, to review it regularly in order to identify possibilities for reduction.

As a response to EU citizen's complaints that the EU regulates too many requirements, the Commission has made a concerted effort over the past few years to streamline legislation and reduce regulatory burdens. The UWWTD SIIF is highlighted as an example of "responding to the Regulatory Fitness Challenge: New Horizontal Actions" by looking at administrative requirements as reporting at the stage of implementation by Member States in order to reduce burden where possible. The Member States will be invited to contribute to the initiative by providing information on the way in which they have transposed the set of reporting requirements nationally.

- The Commission Staff Working Document SWD/2013/18 final "EU Shared Environmental Information System Implementation Outlook" highlights the need to develop the concept of SIIF to bridge a number of gaps that currently prevent adequate implementation of the EU environmental acquis communautaire.

Starting from an analysis of the current shortcomings of SEIS and the important recent changes in the way data and information are provided and accessed by the citizens and all the other end users, it highlights the need for credible information on the state of the environment and current trends. To help in this, the SIIF concept needs to be developed further in support of implementation of EU legislation, to identify and extend best practices. The future information management system will be supported by the EEA and backed by the INSPIRE development on interoperability arrangements and improved framework of cooperation among Member State authorities and Commission services.

2.2 UWWTD SIIF Pilot and pilot MS

The implementation of the UWWTD is a challenging task. Significant progress has been made over the past years. Its bi-annual reporting system to assess compliance with the Directive is overall well established and operational and recognised as one of the most efficient reporting exercises. The Directive is more or less implemented in the EU-MS which were part of the EU before 2004; there were some signs of improvements in the newer Member States. However, experience gained in the older Member States should be harnessed to help progress in the new Member States. Meeting the challenges of the UWWTD requires pro-active and forward looking policies which aim to protect the environment rather than simply avoiding undesired results (i.e. the fear of potential EU sanctions). Such policies should establish clear and realistic commitments and targets, with appropriate allocation of resources and information to the public. However the public availability of EU assessment reports and the age of the data used for the assessment make reports outdated to take decisions and develop such policies. It does not mean MSs have not made any effort and that the result is not good, but a shift in the approach is necessary to gain more up-to-date, transparent and easy-to-access information for a broader public. In any event, when appropriate, the Commission might bring cases before the ECJ based on its continuous assessment of compliance in Member States.

Making updated information on compliance and related pressures on the environment available to the general public is a very important aspect. The untreated or insufficiently treated sewage discharges during dry and wet weather represent one of the main pressures on health and environment. Without a good implementation of the UWWTD, it is not possible to reach the objectives of other relevant directives like the Water Framework Directive, the Bathing Water

Directive or the Marine Strategy Directive. Also, one of the key objectives is to reduce the "information" burden both for MS which are in compliance and for those in non-compliance, focusing on concrete needs. Thus, the European Commission services wish to move the reporting system onto the next level with the aim to have an information system that combines national and European systems in order to have more up-to-date information using the latest technologies. Framing this implementation within a SIIF will allow, in the Commission's view, to accelerate the current implementation pace, to improve the results delivered by this implementation and to make the most efficient use of the EU support to this implementation.

Taking these considerations into account, the UWWTD was selected as SIIF Pilot with the aim of identifying all thematic and IT relevant aspects to prepare a vision and roadmap for implementation in the future including the benefits for all relevant actors involved.

With the support of four pilot MS – Cyprus, Ireland, Lithuania and Slovenia – activities in the frame of the UWWTD SIIF Pilot started in January 2013. The specific objective of the MS pilot exercise is to involve MS in the development of the UWWD SIIF pilot from the outset and to test the emerging approaches.

The first results of the pilot exercise have revealed that urban waste water related data and information available for internal purposes is much more comprehensive and up-to-date (data usually updated on an annual basis) than the information published at national web-sites. Most of the pilot MS are operating internal databases/water information system to efficiently assess the performance of urban waste water treatment plants, to compile data for reporting as well as to regularly update data for planning purposes on national level.

Main benefits in an UWWTD SIIF are seen by pilot MS in a better identification of the rate of compliance/progress of compliance in relation to infrastructure and a better identification of bottlenecks for UWWTD implementation and the reasons for delays (CY, SI), as well as improved information and visualisation of urban waste water related data for the public (CY, LT, SI). Furthermore, the receipt of all incoming information as electronic data via web forms, the reduced duplication of information as well as the automated reporting (internal and to EU) is seen as beneficial (IE, LT, SI). On the other hand, financial aspects (in terms of IT relevant structures and missing human resources) as well as current administrative structure (national-regional level) are seen as main limitations in establishing an UWWTD SIIF.

Future activities in all pilot MS will focus on the improvement of a transparent (interactive) visualisation of (more comprehensive) data on national web-pages, possibly including GIS-services.

2.3 The broader context – WISE, SEIS and INSPIRE

In addition to SEIS principles, the UWWTD SIIF pilot will take the interoperability enabled by INSPIRE specifications and services infrastructure as much into consideration as possible. By doing so, it can use INSPIRE as a backbone including the necessary thematic specialisation of concepts where relevant. This will reduce efforts for individual developments. Furthermore it will enable a high degree of interoperability between UWWTD and other SIIFs which are currently under development and may follow in the future.

The delivery of data in the SIIF context will provide more updated information than the current biannual reporting. This will require further adaptation of already existing products both at EU level, i.e. interactive map and data viewers and downloadable European datasets in WISE

currently managed by EEA as well as at national levels. It is expected that some EU-MS continue their reporting via Reportnet. If this is the case, there will be a need to develop mechanisms to integrate the data delivered via alternative pathways. This should ensure that the products in WISE related to UWWTD are kept up-dated with newest data available but differing from one EU-MS to another.

3 THE SIIF FOR THE URBAN WASTE WATER TREATMENT DIRECTIVE

The overall objective of the UWWTD SIIF pilot exercise is to help EU-MS improving the implementation of the UWWTD. Although the reporting aspect and technical data issues are playing a crucial role in the UWWTD SIIF exercise, the aim and objective is much broader: The approach should not only facilitate access to more up-to-date compliance data but also provide any other relevant data and information, e.g. on solutions and governance, taking into account the needs of different sectors of the public (general, experts, scientists, NGOs, and private companies). As for the technical details, the UWWTD SIIF is about the development and testing of a decentralised system in order to manage and actively disseminate data and information in relation to compliance with the UWWTD and to improve the data and information flow at EU level. Such a system will rely upon national SIIFs, driving them to become the crucial stepping stone for making reporting data interoperable. The UWWTD SIIF pilot exercise will pave the way forward to implement the SIIF approach also for other EU environmental legislation.

3.1 SIIF principles

The SIIF builds on the general principles already developed in the context of SEIS and WISE; in addition, a SIIF should be based on the following specific principles[9]:

- **"1. Focus on compliance":** SIIFs should primarily ensure that relevant data and information on the implementation of the UWWTD at national level is prepared. This entails the collection and handling of compliance data above all, but also of other information that provide the additional knowledge that will at the end allow drawing a more complete picture (e.g. legal and administrative information, socio-economic data, status of environment, etc). Such a focus requires a common understanding on the main provisions of the legislation which normally is supported by guidance on implementation and reporting (see below also under self-assessment). The clear focus on compliance does not prevent the use of the information by many different kinds of users, if it is clearly presented. Some kind of simplification will be nevertheless needed, in order to identify a short number of possible users' communities whose needs should be met (e.g. general public, administrators and researchers, and private companies).

- **"2. Be easy to access and focus on users' needs"**: the usability of the information has to be ensured for all users' communities (scientists, policy makers, general public, private companies, etc). The information on implementation and compliance should be easily available and accessible in such a way as to ensure usability for different groups of end

[9] Based on the experiences gained through the UWWTD SIIF exercise, the principles – as stated in section 3.1 – might need to be refined and further developed.

users. Online means (i.e. web portals) appear to be the most adequate channel to make the information available. But not all portals/web sites/pages have the same success. The reasons why currently existing systems are not visited (or, at least, not with the frequency expected or sought) has to be found in both the nature of the information presented (see above) and the way in which the information is presented.

- **"3. Be up-to-date": r**ather than continuing a rigid timetable for reporting (ranging from annual to once every six years), **EU-**MS should be able to update their information when data become available, provided that they fulfil minimum requirements ensuring their quality and their reliability. On the other hand, it is possible to identify the elements of information that are based on stable data and for which no changes are likely to happen in a short period of time. A balanced approach is therefore needed to conciliate the need to have updated information and the need to reduce the frequency (and the costs) of updating. Common reference years may be a solution to allow sharing data more easily and implement reporting requirements. The differentiation between stable and contingent information should be made for the data handled, even considering different frequencies. Furthermore, the updating frequencies may also differ between EU-MS taking account their level of compliance, i.e. those features which are in compliance may need to be updated less regularly than those which are not.

- **"4. Be forward looking (solution oriented)"**: meeting the challenges of the implementation, the EU environmental legislation requires pro-active and forward looking policies which aim to protect the environment rather than simply avoiding undesired results (i.e. the fear of potential EU sanctions). Such policies should establish clear and realistic commitments and targets, with appropriate allocation of resources and information to the public. In fact, bad results of the implementation of the Directive can be explained by a wrong assessment of MS' obligations. Adapting to such perspective will require the introduction of new data not covered by present information systems (e.g. socioeconomic, planning aspects, etc). But the advantages are evident: if SIIF approaches are used, citizens above all, but also any kind of experts, will know how, when and at which cost the actions needed to complete the implementation are to be taken.

- **"5. Work in a decentralized way and carry out legal compliance assessments at lower levels":** SIIF approaches will necessarily promote the change from current centralized systems (include those dedicated to reporting) to systems allowing flexible and more decentralised management of the information. Manual upload of information into a data centre should be gradually reduced and replaced by exchange of the same information via distributed information systems, namely between EU and national nodes. As a consequence, it will be increasingly for EU-MS to assess their compliance regarding certain provisions (as they already do e.g. on bathing water or air quality). If EU-MS carry out the compliance assessment themselves there must be a common understanding on the criteria and the methodology to be applied, as well as a total transparency in the process to be followed. Past guidance on main concepts and assessment of the UWWTD[10] provide good basis to further develop these aspects. In turn, the Commission could then focus on the plausibility checking of the national results, including some kind of auditing rather than doing the compliance assessment. There is already some degree of

[10] http://ec.europa.eu/environment/water/water-urbanwaste/info/pdf/terms.pdf.

automatized assessments possible at EU level. New rules and tools will have to be developed to enhance these processes.

- **"6. Share the information (increase transparency)": t**he necessary increase of data exchange will require the systems to use INSPIRE. This important aspect was already highlighted by the Communication "Towards a Shared Environmental Information System (SEIS)," (COM (2008) 46). Furthermore, all data should be available to the public and thereby increase transparency, as required by Directive 2003/4/EC (in particular Article 7). Only if EU-MS and EU nodes use the same semantics and formats, it will be possible to ensure the exchange of data and information in a useful way. Crossing the information from different sources (i.e. mostly MS) or about different domains (i.e. other directives), requires complete compatibility. Moreover, dissemination via map-viewers or similar means will only be possible if total interoperability is ensured. This would also require a closer collaboration between the SIIF and wider SEIS agenda because SEIS is covering a wider range of environmental information beyond compliance data. By ensuring alignment with INSPIRE, the sharing of all kind of information between MS and the active dissemination through national websites afterwards, will be possible. However, the full implementation of INSPIRE is a pre-requisite for a successful SIIF approach but it may not necessarily be enough to ensure "interoperability".

- **"7. Increase efficiency and reduce administrative burden":** Adopting a SIIF approach would allow establishing different updating frequencies for the information and data submitted to the Commission within reporting exercises, since the focus would be on non-compliant situations and on the identification of stable data that should not be updated very often (likely periods longer than two years). This would constitute the most important gain of the new system in terms of administrative burden (see also 4.1). One way to reduce administrative burden is to reduce the amount of information needed or the frequency of reporting. But the implementation of information systems based on the SIIF concept will enhance the quality and enhance the availability of the information on compliance, too. For private companies and researchers, access to these data yields opportunities to start or complete research activities, saving time and funds.

- **"8. Develop step-by-step": t**he SIIF idea is necessarily a living one and it will not be implemented everywhere from one day to another. A modular approach, adding additional layers of information or expanding the systems to cover different activities is therefore the right approach. This will require simple rules to transform current systems into new ones, allowing EU-MS a progressive and smooth transition. It would also mean that not all EU-MS have to apply the SIIF approach at the same time. A transition period could allow some to move quicker and others to apply the "old" reporting system. This would also increase acceptance. It is nevertheless of utmost importance to define the core part of the system from the outset, i.e. the reference stable data to which all different types of information are to be related. Later on, in a structured way, the system could grow adding new elements. This approach, starting simple and getting more sophisticated on the way, allows also for early results and thereby reaping the “low hanging fruits”. Such an approach will also minimize transition costs. Reusing/combining current elements is the natural approach in a modular growth.

The implementation of these principles should mainly be driven by the EU-MS self-interest to improve their implementation of the UWWTD with the SIIF as a central element in their own implementation work. The reporting aspect for the EU level should arise as a side benefit rather than being the key driving force for developing a SIIF system.

3.2 Thematic aspects: Vision for the future

The starting point for the development of the UWWTD SIIF as regards thematic aspects is the current management of information relating to the UWWTD. The UWWTD provides three instruments to collect, assess and disseminate information on the implementation of the Urban Waste Water Directive:

- the request for enforcement information to check compliance with the Directive (Article 15(4)),
- the biannual situation reports (Article 16) for information of the public on the actual situation regarding the treatment of urban waste water as well as
- the information on the Member States’ implementation programs (Article 17) to provide forecasts on the implementation of the Directive.

Under Article 15(4) of the UWWTD, a regular electronic data flow from the MS to the EC via Reportnet facilities has been successfully established according to WISE-principles. It allows the assessment of the implementation of the Directive (Implementation Reports), but also the visualisation (a part of data put in the UWWTD WISE Viewer) and dissemination of information (Waterbase). The first attempts for reports were made in the late 1990ies, but the data model was completely redesigned in a joint process between the COM and EU-MS in the years 2003 to 2005. Data flows, common understanding of procedures and roles are already established among the parties involved in the reporting system, which is considered running and operational. The existing set of parameters (about 230) has been analysed seeking for potential improvements, namely to avoid shortcomings and redundancies. Several shortcomings of current UWWTD data flows that have been identified will have to be tackled by the future reporting system. These shortcomings refer to the assessment of the current and the future situation on compliance with the Directive and to the inter-linkage with other water-related legislation.

As for the information requested under Article 16, a common table of content was agreed in the 1990ies to ensure comparable information for all EU-MS.

Under Article 17, the format for submission of data was fixed in 1993 by the Commission Decision 93/481/EEC but reports only provide highly aggregated information and forecasts on the different options of the Directive. Information derived through reporting under Article 17 are core to the forward looking aspect and that is why the Commission is using the SIIF exercise to improve the data collected through Article 17 reporting triggering also a discussion to revise the outdated template. The information will cover the collecting system, IAS and urban waste water treatment plants.

It is proposed that the changes to the established system in terms of contents and roles will be kept to a minimum and that the final proposal will not increase the number of compulsory parameters for each agglomeration and treatment plant except for the forward looking aspect in link with Article 17. Changes being considered at present include:

- New parameters (mandatory and / or voluntary) in particular to avoid current shortcomings and to have more information in link with the discharges.
- Changes in the status of parameters (mandatory / voluntary parameters). The new data set proposed has common (i.e. for all EU-MS) and optional parts.
- Changes in the methodology for the assessment of existing parameters.
- Incorporation of information on measures to achieve and/ or maintain compliance with the UWWTD, including on related costs and planning on financing including investment plans.
- Incorporation of administrative information (who is responsible/ accountable).

The new aspects are intended to be covered in different modules, which could be flexibly linked to the current UWWTD Article 15(4)-dataset. The new modules can be completed in respect to the respective EU-MS and its required obligations to comply with the Directive and gradually delivered depending on priorities (i.e. transitional complying periods, dimensions of agglomerations).

Not all the changes in the new reporting systems are due to the proposed new data model. A whole new approach regarding functions to be performed, frequency of exchanges between the EC and the EU-MS and frequency of reporting is needed if the SIIF concept is to be fully developed.

3.3 SIIF as a decentralized Information System

Meeting the SIIFs ambitions presented above will require the management of the information in a way that goes beyond the current situation and that aims building a true shared information system (SEIS). The nature of the information to be managed, its origin and purpose, the public which is targeted and the technological choices required, make the UWWTD SIIF a first class choice to build such a system.

One of the key restrictions to an effective reporting process is the fact that the legal and practical responsibility in the EU-MS is heterogeneous and involves a wide set of different actors on various levels based on national constitutional and legal regulations (e.g. operators, counties,

municipalities, federal states, environment agencies). This of course cannot be fully solved by the SIIF but implementing a decentralization approach will help improve the situation. As compared to the current situation, SIIFs are intended to be distributed systems, which shall consist of two fully interoperable “components”: National and EU-level SIIFs. This is the way EU legislation is implemented generally, by involving two players: the EU and the EU-MS at national level, responsible for the implementation on its territory. Two levels of information are at least needed to ensure that the information on the one hand is useful and managed as close as possible to its source and on the other hand is presented to many end users, at many EU levels.

- National SIIFs nodes are intended to be established at EU-MS-level taking into account the different information sources, data models and/or information systems and MS-specific aspects. All national SIIFs have to deliver the same EU-level SIIF core elements and include data management elements which are common across the EU (i.e. parameter contents, data formats, data exchange functionalities, QA/QC-rules). These common elements are more detailed in the background documents of this concept paper. One of the goals would be to make it possible to reach a 12-months period by an increased use of a more automated approach.
- The EU-level UWWTD SIIF will have to serve as a node to bring together the SIIFs from EU-28 MS. It will guarantee the inter-linkage to other information systems and its flows (e.g. the Water Framework Directive) and the interaction with existing and future European initiatives.

In line with this division, there will be, in broad terms, two main processes: centralised (i.e. the information is collected and sent to the Commission, who takes care of all processing, from QA/QC to ensuring the active dissemination) and decentralised (i.e. the information is collected, processed and the results of the assessment are actively disseminated at national level).

For EU-MS having chosen the centralised approach, all these data will be submitted to the EU level, which would take care of the processing, assessment and dissemination. If the decentralised approach applies, then the EU-MS concerned will process the information and conduct the compliance assessment themselves.

3.4 IT aspects: Vision for the future

For the SIIF development, the thematic and information technology aspects are closely linked. Considering the IT aspects from the outset is crucial for the success of this exercise. Two main elements have to be considered when discussing the IT aspects for the UWWTD SIIF, the backbone of the system, the way to ensure that the information is exchanged between SIIF nodes as well as the frontend of the system (the accessible interfaces). The proposed options will be tested with pilot EU-MSs in 2014 and adjustments proposed.

3.4.1 The backbone of the system

For the backbone, the fact that at present there is a system running to ensure the exchange of information between the COM, the EEA and the Member States, influences the development of

the IT system for the SIIF. It is hence necessary to consider three aspects: (i) the SIIF principles, (ii) the necessary changes for the current system and (iii) the overall IT framework.

In broad terms, the requirements for the architectural design of the future UWWTD SIIF originates mainly from the INSPIRE Directive (2007/2/EC), that obliges public institutions to make their data accessible using spatial web services and common data formats. This constitutes a clear incentive to directly propose an "INSPIRE Compliant" UWWTD reporting system. The return on the additional effort this requires lies with a reduction in the reporting burden. This is done via the automation of part of the reporting through machine to machine communication and via a simplification of the data model, improvement of the definitions of concepts and hence comparability across the EU as well as a better integration in the overall system. This also includes the possibility to develop automation in the use of the collected data by providing summary statistics and maps directly connected to – and updated with – validated datasets.

The current UWWTD-reporting is a hierarchical setup based on human work starting with data points each, reporting to higher level data nodes. The nodes collect data from different data points and forward them again to the next tier of the system until the data finally reaches the EEA as final destination and highest level of the reporting system.

The first priority in the development of the UWWTD SIIF focuses on the development of a system allowing the automated exchange of information between a national node (i.e. an e-reporting system at MS level) and a EU node, in a fully interoperable system. However, in case an EU-MS considers it relevant, the system to exchange information could be further expanded towards a shared information system which includes information nodes on all tiers, from local to European level. In any event, the development will be made in line with the INSPIRE approach.

To allow for this exchange, two elements are needed: a) a shared data model including shared terms/definitions (the semantic) and information on data flows, b) and tools that allow the exchange of information (the services).

a) The choice for INSPIRE has important influences for the design of the Data Model, notwithstanding purely thematic aspects. The Data Model should incorporate the following features as regards the terms/definitions (semantic) and data flow aspects for the UWWT SIIF

- Use of INSPIRE Data Specifications to integrate UWWTD SIIF in the European data and information framework (INSPIRE compliance). When needed there might be an extension of these Data Specifications.
- The description of the common data model is made using a specific format largely used on the web: UML models and OGC and ISO 19100 series standards.
- Terms and definitions (semantics) from other relevant Directives are to be taken into account via other Inspire compliant models.
- It will contain the life cycle information and unique identifier (inherited from INSPIRE data specification).

b) The service oriented architecture is one of the key features of INSPIRE. There is a set of web or network services[11] types to achieve machine-to-machine interactions. These services are

[11] Services are operations which may be performed, by invoking a computer application, on the data contained in data sets or on the related metadata. Network services are necessary for sharing data between the various levels of public authority in the Community. (INSPIRE Directive).

related to discovery (metadata), viewing, downloading and transformation of data. Within INSPIRE, their implementation guidelines are based on open specifications and standards (e.g. ISO, OGC, W3C standards). As all information in UWWTD are related to geographical objects, it is proposed that the UWWTD SIIF makes use of the web service defined by INSPIRE for download services in order to achieve machine-to-machine communication, transparency and interoperability. This service is the Web Feature Service (WFS) defined as interface standard by the Open Geospatial Consortium (OGC).

In addition to these two main elements, other aspects will also have to be addressed, e.g. the technicalities concerning the support of e-reporting, data management rule, specificities of the EU-Level node, frequency of reporting or transitional periods, etc.

3.4.2 The interfaces

The IT requirements mentioned above concern the "invisible part of the system". Once this has been accepted, the way information should be made accessible online (SIIF interface) can be defined in detail. In this respect, it should be noted that a number of common functionalities available at each node are to target:

- Content visualisation: Cartographic interface, graphics, summary information and detailed factsheets, downloadable formats,
- Common IT information access: data model, code lists,
- Helpdesk availability,
- Data flows representation,
- Links between EU-level and MS nodes from an interface perspective
- UWWTD legislation overview
- Functionalities specific to the EC node of the system (but that can be implemented at each node): validation & compliance service.

Complementary to the two aspects defined above (backbone and frontend), the preparation of the IT system for the UWWTD SIIF raises questions on the need to ensure that a number of functions are performed, in order to ensure the overall IT consistency (data models, SIIFs architecture) and the internal consistency in the domain (initially for the UWWTD, later on for other directives).

It is strongly advised that already existing structures receive the mandate to take care of these functions, such as:

- EU level interoperability board: Inspire “Maintenance and Implementation Framework” and “Maintenance and Implementation Group”.
- Normalisation structure for the water information silo: WISE SG supported by WISE TG.

4 EXPECTED BENEFITS

The changes introduced by the incorporation of SIIF principles into the current reporting system have to be seen as aimed at improving the state of the environment, via the implementation of all environmental EU legislation. The enhancement in the quality of the information, the empowerment of the administrative levels closer to the citizen should, in turn, make the

implementation of the Directive easier and the status of environment, therefore, better. What is more, the proposed new structure for the system is also to be less burdensome than the current one.

4.1 Enhancing the quality of the information on implementation

By applying the UWWTD SIIF approach, all relevant actors – the EC, other EU stakeholders, but in particular also citizens, NGOs and private companies of EU-MS – may in the future by simply clicking in WISE be directed to the national websites to receive the most available up-to-date and actual information on the status of waste water treatment in their respective countries.

The proposed inclusion of additional parameters and the modification of assessment methods in the EU-level SIIF will allow an efficient and up-to-date assessment of the implementation of the UWWTD, which provides homogenous results from the EC- and the EU-MS-point of view. It will also enable the assessment of the influence of the UWWTD to other water-related Directives (e.g. WFD and daughter Directive 2008/105/EC on environmental quality standards, MSFD, and BWD), the identification of UWWTD-implementation gaps and the measures and costs to overcome these gaps. From the EU-MS-point of view the implementation of UWWTD SIIFs could therefore serve as management tool for national (and even regional) administrative purposes and to provide homogenous information not only to the national/ regional bodies dealing with UWWTD-related information, but also to the interested public and the EC.

Thus, on the long-term the benefits of the UWWTD SIIF are a higher efficiency as regards time and human resources and the broader acceptance of waste water related measures through transparent publication of information.

The expected benefits of an UWWTD SIIF can be summarised as follows:

- Efficient reporting and assessment of implementation of up-to-date and actual information
- Guaranteed transparency of reporting and assessment process
- Forward looking perspective on measures where needed to reach compliance
- Improved inter-linkage of information collected at EU-level
- Improved access of the public to compliance

4.2 Reducing the administrative burden

The decrease of administrative burden is one of the principles of the SIIF concept. In this particular case, the goal is to promote a more efficient (and less burdensome) reporting system which, at the same time, is to deliver accurate and reliable information:

- The establishment of more automatic exchanges and assessments will decrease the need of manual exchanges with the EU level for all MS.
- The proposed draft data model intends to reduce the number of data for EU-MS compliant with the UWWTD and, at the same time, to diminish the frequency of updating for all EU-MS. The main goal will be brought forward by the changes in the frequency of submission of the collected information. It is proposed that the updating frequency is made dependant on:

- The nature of the information. The more stable is the information (e.g. name of the agglomeration, coordinates of the discharging point), the lower the updating frequency: they should only be changed when needed.
- The compliance status of the agglomerations or treatment plants concerned. The focus should be on those agglomerations and treatment plants still non-compliant, leaving the rest already compliant aside for longer periods.

As an example, for EU-MS compliant with the UWWTD, if the information for compliant agglomerations below 10,000 p.e. is required only every four years instead of every two years, there would be a huge decrease of newly submitted information, since these agglomerations represent more than 60% of all the agglomerations of all EU-MS. If the threshold is increased to 100,000 p.e., the number of agglomerations to update each two years will represent less than 10% of all agglomerations, but it will still represent more than 50% of the load generated.

- One indirect result at national and EU level will be the decrease of formal information requests (written, e-mail, phone) by finding easily more accurate information at the national level trough active dissemination.
- With a more useful database for other relevant Directives, international Commissions and Conventions, there will be a decrease or deletion of the need to establish other ways to harvest information.

This evolution of updating frequency of reporting under UWWTD has to be put in link with the requested harmonisation of the reporting cycles under water legislation (section 2.5 of the Blueprint).

5 ROADMAP FOR IMPLEMENTATION OF UWWTD SIIF

The roadmap for implementation of an UWWTD SIIF is a description in a concise document of what should be done to transform the currently existing information system regarding the UWWTD implementation in a UWWTD SIIF. It has to take into account the wide diversity of situations encountered in EU-MS on both financial and IT aspects. Although discussions are still on-going on the definition of the roadmap, it can already be foreseen that the system will have to deal with a transition period with 3 technical parallel solutions running:

- E-reporting using WFS as described above,
- Reporting using Reportnet as it is used today,
- Reporting using a centrally maintained toolset providing the exact same functionalities (service oriented architecture and interface) a national SIIF is expected to, but hosted on the EEA IT infrastructure

Considering what was described in the previous sections and in the related Annexes to this concept paper, the implementation of a UWWTD SIIF requires:

1. The test of the current proposed system on concrete examples in pilot EU-MS and the associated experience gained, some progress on the Article 17 reporting content and on infringement aspects which are also linked to the compliance,
2. a final delineation of the UWWTD SIIF concept paper,

3. the implementation of a permanent body to address domain and IT consistency in an iterative and interlinked approach,

4a. the finalisation of a full INSPIRE compliant data model and the development of the reporting infrastructure (Reportnet, WFS, code lists repository),

4b. the adaptation of the EU system,

5a. the development of the visualisation nodes (EU, MS),

5b. the development of QA/QC on content and tools aspects,

6a. the development of EU supporting services (transformation, validation and notification services),

6b. the dissemination of EU datasets via layers, files (csv, xls…) and services (CSW, WMS, WFS).

The above aspects need to be developed mostly one after the other, but those requiring more time can start before the previous step is finalised or even together (especially a and b). All should be based on the same (Inspire compliant) data model. This transition period will help pinpoint which of the 3 is the most pragmatic for MS.

6 LIST OF BACKGROUND MATERIAL AND RELATED DOCUMENTS

For more background information, the concept paper is accompanied by two Annexes and three background documents including more detailed information regarding the different aspects of the UWWTD SIIF pilot exercise. Please find below more explanations of what to find and who the addressee of these documents are:

- **Annex 1: List of acronyms and EU related legislative/policy instruments**

Annex 1 provides a list of main acronyms used in the activities of the UWWTD SIIF pilot exercise as well as links to EU Directives and Communications which are implemented by the SIIF project

- **Annex 2: Principles underpinning the Shared Environmental Information System (SEIS)**

The Shared Environmental Information System (SEIS) is a core component for the UWWTD SIIF IT aspects. It is therefore important to remind the key principles on which it is built.

In link with the concept paper there are three background documents available:

- **Background document: "Current situation of information management related to the UWWTD and urban waste water on Member State- and EU-level" Report**

This document includes information on the status quo of urban waste water related data available in EU-27 MS, including background information on the data exchange processes, as well as the achievements and shortcomings of the current situation in the light of the SIIF principles. Approaches that have been used at national and EU-level to ensure the publication and exchange of information in relation to the implementation of the UWWTD and to urban waste water in a broader context are described in this Report. This document is addressed to decision makers in the EC, other EU-stakeholders such as the EEA or EUROSTAT as well as EU-28 MS

involved in the implementation of environmental acquis communautaire, and more precisely in the implementation of the UWWTD.

- **Background document: IT aspects**

This document describes in details the set-up of the UWWTD SIIF as regards the different IT components necessary to implement it as a shared information system. This entails the backbone of the information system, the node frontend, the SIIF deployment, but also its inclusion in the overall picture and connection to the other SIIFs to be developed. It also provides two supporting documents: a first delineation of the core use cases of the future UWWTD SIIF and a tentative development of a UWWTD SIIF INSPIRE compliant model on core elements of UWWTD which demonstrate that no major obstacle exist to shift from the current system to an INSPIRE compliant system and shows interesting added value for the accuracy of the reported data by the questions it raises. Common interface functionalities are also proposed. It is addressed to IT specialists, architects at EU and EU-stakeholders as well as MS level.

- **Background document: thematic aspects**

This document includes proposals for additional parameters to be included either in the existing Article 15(4)-reporting or in terms of additional modules to the current Article 15(4)-reporting. The document describes the reasons for these parameters, highlights possible difficulties for their provision and proposes ways for their progressive implementation. Furthermore, this document gives first ideas on internal databases and aspects, which could be linked to the UWWTD SIIF from the EC-side and from the MS-side. This document is addressed to the UWWTD Committee, which will have to decide about additional parameters for the UWWTD SIIF on the long-term and to the national bodies in charge of managing UWWTD-related information.