

Project Charter

Feasibility Study for the establishment of an Electronic Data Interchange for Waste Shipments

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1 EXECUTIVE SUMMARY

The administrative burden involved in the processing of documents and information relating to shipments of waste has been recognised by the High Level Group of Independent Stakeholders on Administrative Burden (Stoiber Group) in 2010. Although some administrative burden associated with shipments of waste is unavoidable, this should be kept as low as possible, without jeopardizing the objectives of Regulation (EC) No 1013/2006 on shipments of waste (WSR).

The Stoiber Group estimated that the introduction of an appropriate e-Government system that would replace the manual processing of the large amounts of notification and movement documents throughout the Union could generate annual savings of up to €44 million. In addition to these economic benefits, an efficient IT solution would also contribute to better implementation and enforcement of the WSR through enhanced traceability and transparency. This is an urgent issue and a priority of the European Commission in view of numerous illegal waste shipments, notably to third countries.

In this context, DG Environment launched a study to examine the feasibility of establishing an Electronic Data Interchange (EDI) for Waste Shipments. The main project objective is to assess the current status and to capture the business requirements from a wide audience of stakeholders. This document together with the Architecture Overview represents the main deliverables of the project.

The Project Charter elaborates the WSR-related problems and documents the stakeholders and user needs. With regard to the architectural scenarios for an EU-wide IT solution for WSR, including a common EDI Protocol definition, 4 alternatives have been examined based on the SWOT analysis:

- Alternative 1: Do nothing (disregarded as not a desirable option)
- -Alternative 2: Central system (disregarded as not a desirable option)
- Alternative 3: Decentralised system (disregarded as not a desirable option)

-Alternative 4: Hybrid system (recommended option).

It is concluded that from a technical point, establishment of a common EDI Protocol is feasible with a hybrid system recommended as a desirable option. The system would consist of the Central EU application, National MS systems and a Shared MS application.

An estimate for the Commission-related costs for development, hosting and maintenance of a hybrid system for WSR over the 5-year period (2015-2019) consists of the following elements: (a) Development (1.2 million€); (b) Maintenance 100 000€/year; (c) Training 250 000€ (organisation of at least 2 workshops/per MS) and (d) Infrastructure-related costs of DIGIT: 50 000€/year.

The MS-related costs for implementation of a hybrid system for WSR over the 5-year period (2015-2019) would involve the following elements: (a) Development of the adapter module for its own national IT system for WSR (if in place); (b) Local infrastructure costs; (c) Maintenance costs of 50 000€/year; (d) Support-related costs of 50 000€/year and (e) one-off training costs of 60 000€.

In order to move forward, a step-wise approach is recommended for implementation of a common EDI Protocol and recommended hybrid system for WSR.

First step: Definition of a common EDI Protocol. Preparation of the Data Exchange Specifications (DES) is a starting point for development of a common EDI Protocol. The WSR Art. 26(4) together with the latest amendments give legal basis for definition and development of a common EDI Protocol.

Second step: Agreement on the decision-making process between the Member States. Define the structure and procedure for decision-making between the MSCA in order to reach agreement for selected architecture scenario for a future EU-wide IT system for WSR.

Third step: Decision on the architecture scenario for the EU-wide IT system for WSR (e-TWSS). Following the agreed decision-making process, decide on the selected architecture scenario for e-TWSS.

Fourth step: Pilot project for e-TWSS. Implement a pilot project with selected number of participating countries before the full implementation of the selected scenario for e-TWSS at the EU level.

Fifth step: Decision on full implementation of the e-TWSS. Decide on full implementation of the system with defined timeframe and resources.

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2 Introduction

The administrative burden involved in the processing of documents and information relating to shipments of waste has been recognised by the High Level Group of Independent Stakeholders on Administrative Burden (Stoiber Group) in 2010. Although some administrative burden associated with shipments of waste is unavoidable, this should be kept as low as possible, without jeopardizing the objectives of Regulation (EC) No 1013/2006 on shipments of waste (WSR).

The Stoiber Group thus asked the European Commission to encourage Member States to consider implementing electronic databases for the registration of waste shipments. The use of an IT solution for the processing of the notification procedure (including shipment announcements, confirmations of receipt and transmission of certificates of the treatment operation) is believed to yield major savings for the Member States.

The Stoiber Group estimated that the introduction of an appropriate e-Government system that would replace the manual processing of the large amounts of notification and movement documents throughout the Union could generate annual savings of up to €44 million. In addition to these economic benefits, an efficient IT solution would also contribute to better implementation and enforcement of the WSR through enhanced traceability and transparency. This is an urgent issue and a priority of the European Commission in view of numerous illegal waste shipments, notably to third countries.

2.1 Objectives

DG Environment launched a study to examine the feasibility of establishing an Electronic Data Interchange (EDI) for Waste Shipments. The main project objective is to assess the current status and to capture the business requirements from a wide audience of stakeholders. This document together with the Architecture Overview represents the main deliverables of the project.

2.2 Methodology

The project was conducted in three sequential phases:

First phase, project initiation, was carried out in the first weeks of the project. The main objective was to launch the project, identify stakeholders as well as relevant studies or initiatives to be analysed.

Second phase, discovery phase, focused on desk research and preparation and dissemination of the structured Questionnaire to identified stakeholders. The Questionnaire was sent to 68 stakeholders (institutions) or 93 individual emails. More specifically to: 44 institutions from Member States, 2 EFTA countries (Norway and Switzerland), 5 customs offices, 4 industry associations, 6 waste companies, 3 NGOs and 4 software companies.

Responses to the Questionnaire served as a foundation for the identification of the stakeholders' needs presented in this document. (See Annex 1: Analysis of responses to the Questionnaire). Additionally, 30 interviews were conducted either in person or via phone, Skype or Lync. The WSR-related studies, projects and existing IT systems were studied in depth. (See document Annex 2: Review of the IT systems, studies and projects)

Third, 'to-be' phase, concentrated on the analysis of possible alternatives for an EU-wide IT solution for WSR, including definition of EDI, proposed project scope for implementation of the recommended solution, and costs impacts.

2.3 Structure of the document

This document is organised in 9 sections as follows:

Section 1: Executive summary, highlighting the key points of the document.

Section 2: Introduction, presenting the objectives, methodology and structure of the document.

Section 3: Considerations on the Business Case, describing the legal background, problems identified and presenting the business opportunity for having an EU-wide IT solution for WSR.

Section 4: Possible alternatives for an IT-system, including SWOT analysis and quantitative assessment of four alternative options considered.

Section 5: Scope of the project for the implementation of the recommended solution: the "electronic Transboundary Waste Shipments Solution" (e-TWSS).

Section 6: Costs, time and resources for the implementation of the recommended solution.

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Section 7: Approach, depicting the proposed methodology and step-wise approach towards the implementation of the e-TWSS.

Section 8: Governance and Stakeholders, illustrating how the project would be organised with defined roles and responsibilities of the project team members.

Section 9: Conclusions/Recommendations for the study.

3 Considerations on the Business Case

3.1 Legal background

Economic growth and globalisation have led to a worldwide increase of waste transports across borders, whether on the road, by railway or ship. These waste movements or "shipments" sometimes involve hazardous wastes and can pose potential risks to the human health and the environment. In other cases wastes are traded to replace natural resources in industrial facilities with high environmental standards. In order to ensure an environmentally sound management¹ of the waste and to control waste shipments, certain procedures and requirements have been introduced in international and EU law.²

The Regulation (EC) No 1013/2006 of the European Parliament and of the Council of 14 June 2006 on shipments of waste (hereinafter: Waste Shipments Regulation) specifies the procedures for controlling waste shipments to improve environmental protection. The Regulation establishes procedures and control regimes for the shipment of waste, depending on the origin, destination and route of the shipment, the type of waste shipped and the type of treatment to be applied to the waste at its destination.

The Regulation applies to the following shipments of waste:

- a) Between Member States, within the Community or with transit through third countries
- b) Imported from the Community to third countries
- c) Exported from the Community to third countries
- d) In transit through the Community, on the way from and to third countries.

The key stakeholders³ to the Waste Shipment Regulation are the following:



Notifier, in the case of a shipment originating from a Member State, any natural or legal person under the jurisdiction of that Member State who intends to carry out a shipment of waste or intends to have a shipment of waste carried out ... (Article 2(15))



Competent Authority of

- **-Dispatch,** means the CA for the area <u>from</u> which the shipment is planned to be initiated ...
- **-Destination**, means the CA for the area <u>to</u> which the shipment is planned or takes place,...
- -Transit, means any country, other than the country of dispatch or destination through which the shipment is planned or takes place. (Article 2(19, 20, 21)



Consignee, means the person or undertaking under the jurisdiction of the country of destination to whom or to which the waste is shipped for recovery or disposal. (Article 2(14))



Customs office of

- **-Export** from the Community is the customs office as defined in Article 161(5) of the Council Regulation No 2913/92 establishing Community Customs Code.
- **-Exit from the Community** is the customs office as defined in Article 793(2) of the Commission Regulation No 2454/93 laying down provisions for the implementation of the Council Regulation No 2913/92.
- -Entry into the Community is the customs office where waste brought into the customs territory of the Community shall be conveyed to in accordance to Article 38(1) of Regulation (EEC) No 2913/92.



MS Responsible Enforcement authorities



Collaboration with non-EU countries (not examined within the scope of this study)

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¹ Environmentally sound management of waste "means taking all practicable steps to ensure that waste is managed in a manner that will protect human health and the environment against adverse effects which may result from such waste". (Art. 2(8)) of the WSR.

² http://ec.europa.eu/environment/waste/shipments/index.htm

³ A stakeholder is defined as a person, group or organisation that has an interest or concern in implementation of the WSR.

First, Prior Written Notification and Consent Process (hereinafter: Notification process) for shipments within the Community with or without transit through third countries.⁴ This process applies to the following types of waste:

- 1) All waste destined for disposal
- 2) Waste destined for Recovery as specified in the following Annexes (see Box 1 below for list of Annexes to the WSR).
 - a. Annex IV, so-called 'Amber' listed waste
 - b. Waste listed in Annex III but subject to the procedure of Prior Written Notification and Consent (Article 3(3))
 - c. Waste not classified under one single entry in Annex III, IIIB, IV or IVA, so called "not listed or unlisted waste".
 - d. Mixtures of waste not classified under one single entry in Annex III, IIIB, IV or IVA unless listed in Annex IIIA.
 - e. Mixed municipal waste (waste entry 20 03 01) collected from private households, including such collection also covers such waste from other producers, for recovery or disposal facilities. (Art. 3 (5))

Annexes to the Waste Shipment Regulation

| | • • • |
|-------------------|--|
| Annex IA | Notification document for transboundary movements/shipments of waste. It contains required template with 21 blocks for preparation of the Notification document. |
| Annex IB | Movement document for transboundary movements/shipments of EU waste. It |
| | includes the required template with 18 blocks for preparation of the Movement |
| | document. |
| Annex IC* | Specific instructions for completing the Notification and Movement documents. |
| Annex II | Information and documentation related to the Notification. This Annex has three |
| | parts; the first part lists 26 required information to be supplied on or annexed to the |
| | Notification document; the second part provides list of 10 required information to be |
| | supplied on or annexed to the Movement document; and the third part contains 14 – |
| | types of information and documentation that may be additionally required by the |
| | Competent Authorities. |
| Annex III | List of wastes subject to the general information requirements laid down in Article 18; |
| | 'Green' listed waste. |
| Annex IIIA | Mixtures of two of more wasted listed in Annex III and not classified under one single |
| | entry as referred to in Article 3(2). |
| Annex IIIB | Additional 'Green' listed waste awaiting inclusion in the relevant annexes to the Basel |
| | Convention of the OECD Decision as referred to in Article 58 (1)(B). |
| Annex IV | List of waste subject to the procedure of prior written notification and consent; 'Amber' |
| | listed waste. |
| Annex IVA | Waste listed in Annex III but subject to the procedure of Prior Written Notification and |
| | Consent (Article 3(3) |
| Annex V | Waste subject to the export prohibition in Article 36 |
| Annex VI | Form for pre-consented facilities |
| Annex VII | Information accompanying shipments of waste as referred to in Article 3(2) and 4 |
| Annex VIII | Guidelines on Environmental Sound Management |
| Annex IX | Additional Questionnaire for Reports by Member states pursuant to Article 51 (2) |
| | gulation 669/2008 from 15 July 2008 on completing Annex IC of Regulation (EC) No 1013/2006 of the |
| • | nent and of the Council on shipments of waste <u>http://eur-</u> |
| iex.europa.eu/Lex | xUriServ/LexUriServ.do?uri=OJ:L:2008:188:0007:0015:EN:PDF |
| | |

Second, the process with Requirements following consent to a shipment (hereinafter: Movement process) including preparation of the prior information regarding actual start of the shipment (hereinafter: Movement Announcement), written confirmation of the receipt of the waste by the facility (hereinafter: Written Confirmation of the Receipt/WCoR) and Certificate for non-interim recovery or disposal (hereinafter CoNIRD) by the facility. (Art. 16)

Third, the process for waste shipments that has to be accompanied with the document provided in the Annex VII (hereinafter: Annex VII process). 5 Two categories of waste are subject to this procedure:

- 1) Waste explicitly destined for laboratory analysis with amount not exceeding 25 kg
- 2) Waste destined for Recovery with amount more than 20kg

⁴ See Article 4 of the Waste Shipments Regulation;

 $[\]underline{\text{http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2006:190:0001:0001:EN:PDF}$

⁵ Article 18 of the WSR

- a. Annex III or IIIB listed waste
- b. Mixtures not listed under single entry in Annex III, or two or more wastes listed in Annex III, provided that the composition of these mixtures does not impair their environmentally sound recovery and provided that such mixtures are listed in Annex IIIA, in accordance to Article 58.

For this type of waste, notification process does not apply. Instead, the person under jurisdiction of the country of dispatch who arranges the shipment shall ensure that the waste is accompanied by the document contained in Annex VII.

Key characteristics of the Notification process and the Movement processes are given below:

Notification process (Art.4)

-Applies to all waste destined for disposal and to the specific types of waste destined for recovery.

- -It could be a **Single Notification** procedure, where one Notification corresponds to one shipment.
- -In reality it is usually a **General Notification** procedure, where one notification covers several shipments under certain conditions (Art. 13).
- -Inputs to the process are the Notification document (Annex IA), Movement document (Annex IB) and supporting documentation (Annex II).
- -The Notification procedure involves exchange of information between the Notifier and Competent Authorities of dispatch, destination and transit (if involved).
- -Output of the process is the Consent issued by the involved Competent Authorities.

Movement process (Art.16)

- -Starts after the Consent has been issued
- The procedure involves several steps:

1st movement announcement on the actual start of the shipment sent by the Notifier to the Competent Authorities involved and the Consignee, at least three days before the shipment.

2nd written confirmation of receipt of waste to be send by the facility within three days of receipt of the waste.

3rd certificate for non-interim recovery or disposal to be send by the facility to the Notifier and the Competent Authorities concerned within 30 days after completion of the non-interim or disposal operation, and no later than one calendar year, or a shorter period in accordance with Article 9(7).

-Input to the process is the Movement document being filled in with specific information at each step, signed and sent to the Notifier and all Competent Authorities involved. Also, the movement document and copies of the notification document containing the written consent and conditions, shall accompany each transport.

3.2 Problem statement

The Regulation specifies three key processes for controlling waste shipments to improve environmental protection: the Notification process, the Movement process and the Annex VII process. It should be highlighted that a Notifier may submit a general notification to cover several shipments in line with Art. 13 of the WSR, as it is the case in 99% of the notifications.

The number of the Notifications/year differs significantly among the Member States. The following countries receive and process in average the highest number of notifications per year:

- Germany (ZKS Central Waste Agency) with 4 200 notifications/year
- Netherlands with 3108 notifications/year
- Austria with 1284 notifications/year
- Belgium/Flemish region 1200 notifications/year
- Ireland with 1080-1200 notifications/year
- Sweden with 720 notifications/year

One Notification package means preparing the following documents:

• Annex IA- Notification document with 21 blocks for data input

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⁶ Input received from Competent Authority of Sweden

- Annex IB- Movement document with 19 blocks for data input
- List of 26 information that has to be supplied on or annexed to the Notification document (Annex II, Part I)
- List of 10 required information that has to be supplied on annexed to the Movement document (Annex II, Part II)
- List of 14 additional information and documentation that can be requested by the Competent Authorities (Annex II, Part III).

In summary, one Notification package means preparation of the Notification document, Movement document and 50 supporting information, part of which is optional, to be supplied on or annexed to these documents. The Notification package is submitted to the Competent Authority (CA) of dispatch and, if the documentation is complete, the authority will transmit to the Competent Authorities of destination and transit. If no objections are raised, the consent is issued. The Notification process is presented in Fig. 1 below.

The Regulation specifies that a waste company can prepare a single Notification (covers one shipment) or a General Notification (which covers several shipments). In reality, majority of the waste companies prepare the general notification, which covers several shipments.

After the consent is given to a notified shipment by the Competent Authorities involved, the Notifier will complete the Movement document with actual date of shipment and send it to the consignee and all concerned competent authorities at least three working days before the actual shipment starts.

When the waste shipment reaches the treatment facility, it will issue written confirmation of receipt of the waste and together with signed copies of the movement document send to the Notifier and all concerned competent authorities.

After the completion of the non-interim or interim recovery or disposal operation of the waste, the facility will issue the certificate for non-interim or interim recovery or disposal of waste and together with signed copies of the movement document send to the notifier and all concerned competent authorities.

In practice, this means that each consented shipment involves circulation of at least 3 different documents between the Notifier, treatment facility and all concerned competent authorities.

If we take into account the number of shipments/year in the following 5 countries, the number of documents circulated ranges from 60 000 documents/year to over 1million documents/year. This is an enormous administrative burden for the Competent Authorities and the Industry.

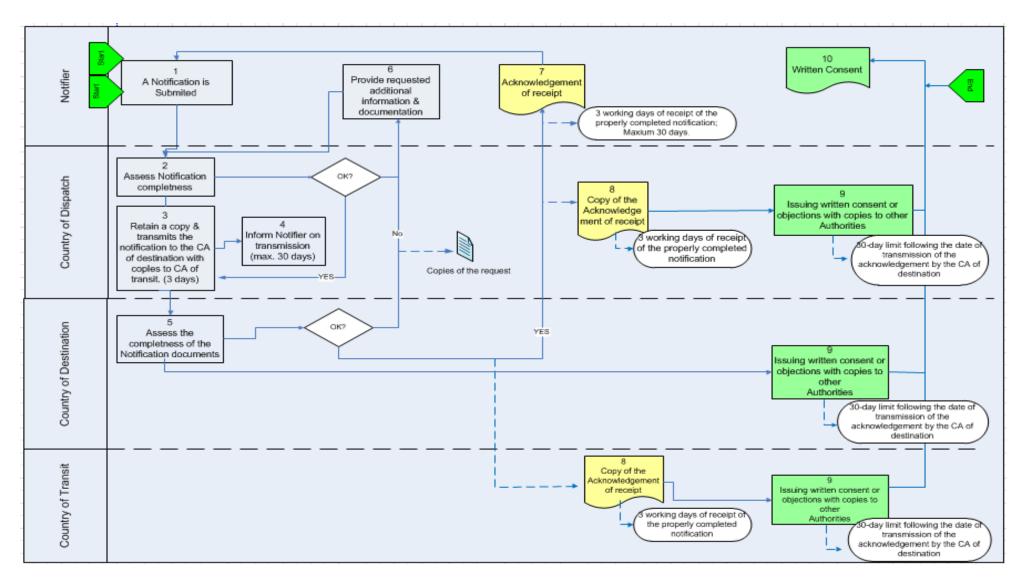
- Germany (ZKS Central Waste agency) > 360 000 shipments/year
- Netherlands > 170 000 shipments/year
- Austria approximately 150,000 shipments/year
- Belgium/Flemish region > 65 257 shipments/year
- Sweden > 60 000 shipments/year
- Ireland approximately 15, 000 amber shipments/year

Having this in mind, and noting that 97% of the Competent Authorities uses in most cases post for notification-related communication, among other formats (e.g. email without digital signature and fax) and 78 % of the Competent Authorities mostly uses fax to receive and exchange the movement-related documents, among other communication formats (e.g. post, email without digital signature) portraits the scale of the problem faced by the authorities and the industry.⁷

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⁷ See Annex 1- Responses to the Questionnaire, Questions 23&24.

Notification process



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Currently, 7 MS have in place an information system supporting the notification and/or movement-related processes and another, 7 MS have local databases in place. Yet 14 MS do not have any IT system in place for WSR. The lack of any IT system for these 14 MS as well as the lack of a common EDI Protocol to ensure interoperability between existing systems are identified as a main problem.

In addition, the following specific issues related to the overall WSR implementation are identified by stakeholders:

WSR Regulation-related issues

- Divergent interpretations of the WSR provisions by the Competent Authorities (e.g. notification requirements; intended transportation route and possible alternative route(s); postponing the movement announcement; divergent categorization of recovery/disposal operations, etc.)
- 3-days deadline for specific actions by the responsible CAs
- Duration of validity of the notification with proposal of being 1 year after conducting the first shipment instead of 1 year after the consent has been granted.

Implementation-related issues

- Getting the notification signed by the client (sending the original document several times), and obtaining a notification number (different procedure depending on the competent authority of dispatch).
- Not having a uniform perception/understanding from the competent authorities on required documentation to be attached to the notification and movement documents.
- Requiring translation of the documents in a MS authority official language(s), what takes time and money.
- o Identifying the date for the first shipment due to sometime long processing time by the authorities for the notification. In most cases, industry loses days of transport since the transport dates are not aligned with the issued consent.
- Specific problems related to the maritime-shipments (e.g. obtaining the guaranty of the route for maritime shipments; reliability of shippers and shipping agents; getting informed by captains and/or shipping agents on route changes of maritime shipments).
- Indicating the exact packaging type in the Notification document, since from the time of submission of the notification until the first transport, the packaging may have changed. Instead, proposal is that the packaging type should be indicative.
- Staffing and resources shortage.

Lack of IT systems and standards

- Lack of the unified technical standards for data definition and authentication, together with lack of IT systems.
- Existence of different lists (EU Waste code list; OECD list; Basel convention, etc.) without clear rules on the relationship between them, pose a challenge for the companies to correctly identify type of waste shipped and its classification.
- Lack of the specific tariff classification for waste and its correlation with Basel or OECD code directly impair the customs to exercise its control functions. Moreover, there is a lack of clear rules for specifying the differences between the waste and a second-hand product.
- $\circ\quad$ No integration of the waste codes in the customs online tariff database, TARIC.

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3.3 Business opportunity

Establishment of an EU-wide IT system for WSR, including definition of a common EDI Protocol is the opportunity for the Competent Authorities and the Industry to replace current paper-based process with an information system that will allow direct exchange of data making the process more efficient, transparent and cost-effective.

Definition of a common EDI Protocol will facilitate the data exchange between the Competent Authorities and Industry, and between the Competent Authorities itself.

An EU-wide IT system, including a common EDI Protocol would support both Member States with existing systems that want or need to continue their operation, as well as Member States that are unable to invest in their own application.

More specifically, it would bring the following benefits:

Reduced administrative burden. The solution would significantly reduce administrative burden for the companies and MSCA related to different WSR procedures. The Stoiber Group estimated that the introduction of an information system that would replace the manual processing of the large amounts of notification and movement documents throughout the Union could generate annual savings of up to €44 million.

Rapidly available information. The Competent Authorities will have the notification and movement-related information shortly after their submission by the industry. Similarly, the industry will have status dashboard information on sent acknowledgement on recipient of the information to the issued consent. Currently, it takes in average 1 to 3 months to issue consent⁸, if documentation is complete. However, in some cases, it might take more than 12 months. Some documents, such as movement document, are exchanged at different steps in the notification and the movement processes creating large amount of paper being faxed or sent by post. With an information system in place this would be eliminated as movement document would be readily accessible by all concerned parties. The communication between the industry and Competent Authorities would be more efficient and effective as time delays related to the postal services would be eliminated.

Increased traceability and data quality. The solution would facilitate the verification/cross-checking and consistency of data submitted, which is important not only for statistical reasons but also for prevention of illegal shipments. The overall documentation flow between the stakeholders would be accelerated and error-prone processes will be eliminated. The evaluation status of the notification document, including any requests for additional information and/or objections by the competent authorities, would be immediately available to the industry requesting their actions. The consented shipments and their status will be easily monitored by all concerned entities from the shipment announcement to the point of its treatment(s) at a facility.

Enabled reporting and monitoring of the WSR implementation. Reporting and monitoring for the WSR implementation will be carried out more efficiently as consolidated data at the EU level would be readily available in the system.

Inspection and Prevention of illegal waste shipments. The solution would facilitate the enforcement and inspection activities carried out in accordance with the WSR in order to prevent illegal waste shipments. Authorities involved in inspections, including physical inspections, would have access to the electronically submitted data and thus having possibility to cross-check the compliance with the regulation. Furthermore, data exchange between the MS enforcement authorities would facilitate risk-based targeting of illicit waste shipments.

Supported compliance with the OECD decision and the Basel Convention. Existence of an EU-wide IT system for WSR would contribute to the compliance activities under the Basel Convention and the OECD decision as data required would be already available in the system. Optionally, the requested reporting templates could be integrated in the IT system allowing also automatic generation of reports.

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⁸ Some industry representatives highlighted this estimate provided by the competent authorities not reflecting the reality; instead of 1-3 months it should take 1-3 days like it is the common in other industrial/commercial communication procedures.

4 Possible Alternatives for an EU-wide IT solution for WSR 9

This section presents Strengths-Weaknesses-Opportunities-Threats (SWOT) analysis for each of four possible alternatives for the implementation of the WSR. Based on the business requirements derived from the WSR and the stakeholders' consultation process, establishment of a common EDI Protocol is feasible and seen as one of key elements for an overall EU-wide IT solution for WSR.

Additional options for alternatives of decentralised system and a hybrid system are also analysed. An overview of analysed alternatives and options is given the table below.

Overview of alternatives and options analysed

| | Options within the proposed alternative | Reporting module included? |
|---|--|---|
| Not applicable | Not applicable | No |
| Single, central EU application | Not applicable | Yes, part of the central EU application |
| There is no central EU application. Solution comprises of individual national applications that communicate between each other with the use of a commonly accepted EDI Protocol. | Option 3.1: National Reference Application (NRA) + MS national applications Option 3.2: Only MS national applications | Yes, included in the EC-developed National Reference application |
| The hybrid approach attempts to bridge the gap between the centralized and decentralized approaches by keeping the best aspects of both without their main problems. | Option 4.1: Simplified hybrid system with a central EU router + MS national applications Option 4.2: Elaborate hybrid system with enriched central EU application + MS existing National applications + | Yes, part of the central EU application |
| | Single, central EU application There is no central EU application. Solution comprises of individual national applications that communicate between each other with the use of a commonly accepted EDI Protocol. The hybrid approach attempts to bridge the gap between the centralized and decentralized approaches by keeping the best aspects of both without their | Single, central EU application There is no central EU application. Solution comprises of individual national applications that communicate between each other with the use of a commonly accepted EDI Protocol. The hybrid approach attempts to bridge the gap between the centralized and decentralized approaches by keeping the best aspects of both without their main problems. Not applicable Option 3.1: National Reference Application (NRA) + MS national applications Option 3.2: Only MS national applications Option 4.1: Simplified hybrid system with a central EU router + MS national applications Option 4.2: Elaborate hybrid system with enriched central EU application + MS existing |

4.1 Alternative 1: Do nothing

General description

This alternative means continuation of 'business-as-usual', which is burdensome and costly for all involved entities.

SWOT analysis

| Strengths | Weaknesses |
|-----------|---|
| | -Costs for development of individual MS solutions that support only national movements of wasteNo interoperability between the solutions meaning continuation of 'business-as-usual' with tremendous amount of paper exchanged either by post or fax or by streams of |
| | emailsLack of transparency and tracking of shipments (movement process) after the consent has been granted. |
| | -Time-consuming requiring heavy coordination between the involved competent authorities and the industry. |

⁹ see "Architecture Overview" document for detailed description

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| | - Red tape to the industry business due to lengthy process (e.g. 12 months for issuing a consent) |
|---------------|---|
| Opportunities | Threats |
| | -Increase of illegal shipment of waste across the EU and also |

Quantitative assessment

Due to existing heavy administrative burden on the competent authorities and the industry, this alternative is excluded as not a desirable option.

4.2 Alternative 2: Centralised system

General description

In a fully centralized system exists a single Central EU application for all transboundary waste movements. All relevant stakeholder entities (e.g. Notifiers, Consignees, Competent Authorities, and Commission Agents) are registered in this system and need to access it directly in order to perform each task.

Key characteristics:

- Single, central EU application
- All MSCA, EC and Industry stakeholders connect to central EU application
- No remote message exchanges (and no need for secure communication channels)
- Facilitates central monitoring and reporting
- Impact on national systems

SWOT analysis

| Strengths | Weaknesses |
|---|---|
| Single, harmonized implementation Maintenance of a single application Workflow support for elaborate processes Enhanced monitoring and reporting capabilities All participants can directly communicate Simplified communication security and protocol | No integration with existing Member State systems that stands to lose significant investments. Single point of failure Investments needed by the European Commission. |
| Opportunities | Threats |
| - Delivery of a single EU application. | Cooperation of multiple Member States to produce a single application Application would need to offer at least all the functionalities already available in the existing MS national applications. |

Quantitative assessment

Several MSCA invested significant resources in development, implementation and further improvements of its national IT systems and are unwilling to replace them with a single, central EU application. While the industry and MSCA without national system are in favour of having a centralised system, this is not favourable solution for all MSCA. Thus, this option is excluded as not a desirable option.

4.3 Alternative 3: Decentralised system

General description

Using a decentralized system there is no central EU application. The solution comprises of individual national applications that communicate between each other with the use of a commonly accepted EDI Protocol.

There are 2 possible options for a Decentralised system:

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4.3.1 Option 1: Decentralised system with development of National Reference Application (NRA)

A decentralised system would consist of MS national applications already in place and an open source National Reference Application (NRA) that would be developed by the Commission. This NRA could be used 'as-is' by Member States without an existing solution or could serve as the starting point for a Member State that wants to extend what is provided for its own needs. Additionally, the Commission would define a common EDI Protocol to ensure exchange of data between these applications. Note however, that even with the provisioning of a NRA, Member States would still need to ensure resources for the hosting and operation of its system which could be problematic.

4.3.2 Option 2: Decentralised system without development of National Reference Application (NRA)

If the Commission decides not to develop an open source National Reference Application, each Member State would need to invest in development of its own national application and to provide resources for its hosting and operation. The Commission would develop a common EDI Protocol to ensure exchange of data between the national MS applications.

From the architectural point of view, there is no significant difference between these two options, since this is still a decentralised system. However, there are different costs implications depending on the selected option, both, for the Commission and the MS as described in the section 4.

SWOT Analysis:

| Strengths | Weaknesses |
|--|--|
| Member States with existing systems can continue using them with small adaptations Existing work of cooperative systems can be reused as the protocol basis No single point of failure or congestion | Investment needed by each Member State Solution not harmonized (apart from the EDI Protocol) Increased security measures required Monitoring and reporting at an EU-level |
| Opportunities | Threats |
| Full implementation of the project can be phased by including early Member States with an existing system, whereas other can join when ready. Definition of the implementing act on a common protocol for an EDI by the Commission. | Possibility of not reaching an agreement on the protocol among the MS. Big challenge in synchronizing the independent implementation by all Member States implying significant effort for the central authority (DG ENV). |

Quantitative assessment:

The main benefit of this approach is that existing national systems can continue operating albeit with an adapter module that would ensure that outbound transboundary messages are formatted according to the agreed standard and incoming ones are converted to the internally consumed format.

However, a requirement that would be challenging, if not impossible, to fulfil with a decentralized architecture would be the monitoring and reporting at an EU level (e.g. by Commission Agents). First of all, in order to do this, an additional non-national node (Reporting module) would need to be put in operation, which would need to retrieve all required data from the remote national systems through additional messages, specifically designed for this purpose. Apart from the increased effort in defining such messages and implementing their support, the reporting possibilities would be limited and very difficult to evolve. Moreover, performance would be a significant concern since most reports would require combining information from multiple remote data sources. Finally, without a central node keeping track of the exchanged messages, inconsistencies between different national systems could appear that would be difficult to resolve. Thus, due to above mention reasons development of a Reporting module by the Commission is possible but not really recommended.

Another concern of this approach would also be securing communications and establishing trust that received messages are authentic and that remote national systems are authenticated. In order to secure the communication channel and provide system authentication, all web service message exchange takes place over channels encrypted with 2-way SSL, i.e. using server and client digital certificates.

The monitoring and reporting challenges, increased security measures, and the need for individual Member States to develop and/or operate their own system leads to this alternative being disqualified.

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4.4 Alternative 4: Hybrid system

The hybrid approach attempts to bridge the gap between the centralized and decentralized approaches by keeping the best aspects of both without their main problems.

The topology put forth by this approach foresees individual national Member State systems that, in contrast to the fully decentralized approach, do not communicate directly with each other but rather relay all communication through a central EU node. The overall topology resembles that of a star.

The hybrid system with the star-based topology offers certain key benefits that are common to all cases:

- **Security:** the communication channels are limited since we now have one channel per MS rather than channels connecting each MS system to all others. The limited number of channels makes use of 2-way SSL realistic and significantly simplifies certificate management.
- Location abstraction: the central EU node effectively acts as an Enterprise Service Bus (ESB)¹⁰, abstracting the physical location of each MS system from the others. An address change for one MS system endpoint would require a single configuration update in the central EU node, rather than an update of all other MS systems.
- Evolution possibilities: this topology allows options for evolution which can also be rolled out in an iterative manner. An example is the central EU node that can be extended from performing simple routing tasks to also exposing rich use cases for reporting by Commission and MSCA officials.

There are 2 possible options for a Hybrid system:

4.4.1 Option 1: Hybrid system with simplified central component called Central EU router

This approach is a version of the hybrid topology where the central EU node is a simple routing service whereas no provision is made by the Commission for the national IT system of each Member State. Following this approach, each Member State is required to provide and operate their own IT system, and connect it to the central EU node for routing purposes. Considering its simplified purpose, the central EU node is referred to here as the central EU router.

SWOT Analysis

| Strengths | Weaknesses |
|--|--|
| Support for Member States with existing systems Enhanced security and configurability compared to a fully decentralized approach Ability to reuse existing work to define communication protocol Limited costs for Commission for the development of the central components | Investment needed by each Member State Single point of failure Limited support for MSCA and Commission reporting needs |
| Opportunities | Threats |
| The central EU router could be incrementally extended to support additional needs Full implementation of the project can be phased by including early Member States with an existing system, whereas other can join when ready. | Cooperation of multiple Member States to define the central EU router and the EDI protocol. Coordination of the Member States without an existing solution to setup their national system |

Quantitative assessment:

It should be noted that from the business and functional point of view solely, this option is close to the option of decentralised system without the National Reference Application (see section 4.3.2.) Main reason is that the central EU router as described above would provide simple routing services only.

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¹⁰ An enterprise service bus (ESB) is a <u>software architecture</u> model used for designing and implementing communication between mutually interacting software applications

While existence of the central EU router has its advantages, this option foresees that each MS would need to develop its own national application. Considering that currently 14 Member States does not have any IT solution for WSR, this option is assessed as not a desirable option.

4.4.2 Option 2: Hybrid system with elaborate central component called Central EU application

This approach is an elaboration of the hybrid topology that foresees an elaborated central EU application as well as a Commission provided solution for Member States with no solution of their own. The elements of this architecture are as follows:

- **Central EU application**. The purpose of this is to act as a hub for all national domain systems, perform the appropriate message routing, and maintain centrally the information required to satisfy monitoring and reporting requirements.
- National MS systems. Each Member State could connect its own national system to the central EU application. This case is oriented for Member States that have an existing IT solution in place or for those that want to implement their own (e.g. to cover specific national needs). Existing national systems would need to be updated with an adapter module to transform transboundary messages to and from their national format. Note that additional national MS systems could be implemented as well by groups of Member States (e.g. the Nordic-TFS system) as long as they would comply with a common EDI Protocol and can internally route messages.
- Shared MS application. This is a single application that can be accessed by all parties of Member States that either do not have an existing solution or do not want to invest in one. This application could be developed, operated and hosted by the Commission (driven by DG ENV and hosted at DIGIT) thus removing such requirements from Member States.

SWOT Analysis

| Strengths | Weaknesses |
|---|--|
| Support for Member States with and without existing systems Flexibility to evolve into a more decentralized or centralized system Enhanced monitoring and reporting capabilities Ability to reuse existing work to define communication protocol (e.g. EUDIN) | - Single point of failure |
| Opportunities | Threats |
| Member States can drop their existing systems Member States wanting to implement their own systems can participate from the beginning and only switch when fully ready Member States not having a national IT system will benefit from the Commission-implemented Shared application. | - Coordination complexity with Member States to define the common message protocol |

Quantitative Assessment

A first benefit of this approach is the fact that it supports both Member States with existing systems that want or need to continue their operation, as well as Member States that are unable to invest in their own application.

As in the case of the decentralized approach, a common EDI Protocol is required. This is foreseen to be a common XML format that describes all messages necessary to support the WSR processes. An important difference in this case is that the communication channels are significantly fewer since each existing national system will connect only to the central EU application.

This architecture also allows the system to fulfil its needs with respect to centralized reporting on transboundary waste movements. This is achieved through the central EU application that records all messages exchanged between Member States.

Thus, this alternative is selected as a desirable and recommended option.

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4.5 Proposed solution & specific issues

From a technical point, establishment of a common EDI Protocol is feasible. It is one of the elements of the recommended EU-wide IT solution for WSR (Option 2: hybrid system with elaborate central component) together with the central EU application and shared MS application. The hybrid system combines the good elements of the centralized and decentralized alternatives as described in the previous section without their significant weaknesses.

4.5.1 Applicable standards

The envisaged system will be designed in order to comply with any standards required to support transboundary waste movements involving EU Member States.

Noting that the WSR foresee collaboration between the relevant entities in the EU, including customs authorities, and with non-EU countries, global standards, such as UN/EDIFACT¹¹ of the United Nations Centre for Trade Facilitation and Electronic Business (UN/CEFACT) shall be analysed and taken into consideration.

The United Nations Centre for Trade Facilitation and Electronic Business (UN/CEFACT) is intergovernmental body of the United Nations Economic Commission for Europe (UNECE) Committee on Trade, mandated to develop a programme of work of global relevance to achieve improved worldwide coordination and cooperation in areas of trade and electronic business standards.

UN/EDIFACT (the United Nations rules for Electronic Data Interchange for Administration, Commerce and Transport) comprise a set of internationally agreed standards, directo-ries, and guidelines for the electronic interchange of structured data, between independent computerized information systems.¹²

In terms of other European Commission specific standards relating to IT systems and IT project governance, it is too early to determine specific requirements. It can however be stated that compliance will be assured for any standards that are deemed necessary by the Commission once the solution matures.

4.5.2 Digital signatures

EU-wide available standards and technologies for digital signatures are not sufficiently mature to be used in cross-border public administration related data interchange.

Electronic identification, signatures and trust services are a part of the European Union "Digital Agenda", which was launched in 2010 and it is still work in progress¹³. Press release from June 2012¹⁴ on new Regulation to enable cross-border electronic signatures highlights that the regulation builds on the current e-Signature Directive (Directive 1999/93/EC) and has brought a degree of harmonisation to practices across Europe.

All countries in the EU have legal frameworks for e-Signatures, however these diverge and make it de facto impossible to conduct cross border electronic transactions. The same holds true for trust services like time stamping, electronic seals and delivery, and website authentication, which lack European interoperability.

In this context, several points were taken into account for architecture decision on digital signature:

First, digital signatures involve significant administrative overhead and costs in creating certificates, delivering, managing the certificates' lifecycle and verifying the certificates.

As mentioned, the handling of e-ID schemes for transboundary purposes is indeed not mature enough to rely upon. Moreover, it needs to be considered that most Member States lack such a scheme to begin with. The alternative in this case would be to issue certificates specifically for this purpose (e.g. by a Commission Certification Authority) which however entails the previously mentioned complexities.

Second, the use of personal digital signatures comes from the fact that this needs to take place from the actual end user. Doing this would pose significant problems for Member States with existing waste movement solutions since either two solutions would need to be used in parallel (one for transboundary movements and the existing national one), or the existing system would need adaptation to use the appropriate certificates and the common message format.

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¹¹ http://www.unece.org/trade/untdid/welcome.html

¹² http://www.unece.org/trade/untdid/welcome.html

¹³ http://ec.europa.eu/digital-agenda/en/trust-services-and-eid

 $^{^{14}\;}http://europa.eu/rapid/press-release_IP-12-558_en.htm$

Having this in mind, the proposed hybrid system introduces a central EU application and requires that messages are always routed through national CA applications. In other words there is no direct communication between industries (a Notifier and a Consignee) but all communication passes through multiple verification steps at trusted nodes. This fact allows us to no longer mandate the use of signatures for authentication and non-repudiation. On the other hand, message integrity is provided by securing and encrypting the communication channel between the national and central applications.

It is proposed however that digital signatures are introduced as an optional element in order to:

- Allow for a phased adoption of national e-ID schemes as they are implemented and their transboundary handling matures.
- Allow individual Member States to require signatures from their national participants that, through appropriate configuration, could be verified by the central EU application. For cases where signatures are present these would then be stored to serve the purpose of nonrepudiation.

Note that these optional signatures should be of a level appropriate to enable offline and long term validation (i.e. XAdES-X-L, XAdES-A). Having said this, we still need to consider two important points concerning even the optional use of digital signatures, in order to evaluate their usefulness:

- It is often the case that trusted third party representatives are used to carry out a legal entity's
 regulatory obligations. The envisaged solution would most likely need to cater for such third
 parties and foresee or integrate a means of automatically verifying such a third party's
 relationship to the legal entity.
- When signing, an end user must be presented with the exact content to be signed in order for
 the signature to be meaningful. This presents a challenge when dealing with structured data
 (XML), as in the case of the envisaged system, to ensure that the displayed content is meaningful
 to a non-technical user.

Such concerns would need to be addressed from a functional perspective in order to determine how signatures, even optional, should be incorporated into the solution in a way that is meaningful to the end users and that is in line with how the Industry's legal entities operate.

4.5.3 Authentication and authorization

In terms of authenticating end users the following measures are proposed:

- Usernames and passwords recorded in European Commission Authentication Service (ECAS)¹⁵.
 ECAS addresses issues such as appropriate password strength, account blocking, and password history and offers related services such as password regeneration.
- A required 2nd factor using Short Message Service (SMS) challenges. For a system where establishing user identity is critical for its overall trust a 2nd factor is considered mandatory. An SMS challenge offers the simplest approach avoiding the need to e.g. send secure token generators to end-users.

It is proposed that SMS challenges are also used for important actions in the system such as the creation of Notification or Movement requests.

In terms of authorization, the proposed system will offer a scheme based on roles and permissions, where permissions capture low level actions grouped together into meaningful roles that are eventually assigned to end-users. Through a user's roles each individual action will be authorized on the server-side to ensure that the appropriate permissions to carry it out are present. Apart from this static permission checking, server-side data specific authorization will also take place in order to provide segregation between different Member States and to ensure that only authorized data is accessed (e.g. an Industry user can only access his own Industry's requests).

4.5.4 Message format

The proposed system architecture entails communication between the central EU application and the currently existing national systems.

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¹⁵ https://webgate.ec.europa.eu/cas/eim/external/register.cgi

These systems will need to be updated at the top national level with an adapter module that will transform incoming transboundary messages from the common format to the internal national one and vice versa.

Based on comparative analysis, EUDIN appears as a more suitable candidate considering that is designed as a pan-European format and does not impose difficult to achieve requirements to its participants (i.e. use of signatures¹⁶). The proposal as such is to use the EUDIN format with the following assumptions:

- It is extended where and if needed in order to fully support the foreseen regulatory processes as well as any other WSR aspects not currently covered.
- It is modified where needed to ensure that industries can also be direct senders and recipients of messages. To avoid confusion on this point, the envisaged solution's hybrid architecture does not only foresee message exchange between competent authorities. The important point is that the physical participants in the message exchange are different applications (the central EU application, shared MS application and, where applicable separate applications at the MS level) and not applications at the Industry level, whereas the logical recipients can be competent authorities or Industry actors connecting to these applications.
- It is refined where needed to allow optional digital signatures.
- It is examined in detail in order to ensure that any unnecessary elements are removed. An example would be the username/password information included which for system to system communication is not required.

4.6 WSR amendments

The WSR was amended in 2014 through Regulation (EU) No 660/2014. This amending Regulation presents a good legal foundation to launch the process for the definition of a common EDI Protocol as a part of the pan-European IT solution for the WSR. The following issues are of importance in the context of this study:

4.6.1 Format of communication (Article 26 of the WSR)

In Article 26 of the WSR, paragraph 4 is extended with the following text:

With a view to facilitating the implementation of this paragraph, the Commission shall, where feasible, adopt implementing acts establishing the technical and organisational requirements for the practical implementation of electronic data interchange for the submission of documents and information. The Commission shall take into consideration any relevant international standards, and shall ensure that those requirements are in conformity with Directive 1999/93/EC or provide at least the same level of security as provided for under that Directive. Those implementing acts shall be adopted in accordance with the examination procedure referred to in Article 59a (2).

This amendment applies from 1 January 2016, providing thus a timeline for the definition of the technical requirements, such as a preparation of the Data Exchange Specifications (DES) as a pre-request for the development of a common EDI Protocol and its implementation.

4.6.2 Correlation table (Art. 50, paragraph 4)

Article 50, paragraph 4 of the WSR regarding enforcement in the Member States is amended with a text addressing the need for inclusion of the customs nomenclature (e.g. TARIC codes), as follows:

By 18 July 2015, the Commission shall adopt, by means of implementing acts, a preliminary correlation table between the codes of the combined nomenclature, provided for in Council Regulation (EEC) No 2658/87 and the entries of waste listed in Annexes III, IIIA, IIIB, IV, IVA and V to this Regulation. The Commission shall maintain that correlation table up-to—date in order to reflect changes to that nomenclature and to the entries listed in those Annexes, as well as to include any new waste-related codes of the Harmonized System Nomenclature that the World Customs Organisation may adopt.

Those implementing acts shall be adopted in accordance with the examination procedure referred to in Article 59a (2).

The expected adoption of implementing acts for a preliminary correlation table between the relevant codes, responds directly to the industry concerns identified during this study.

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¹⁶ Based on comments provided by Germany, electronic signatures remain indispensable for secure authentication considering that the WSR currently holds responsible for irregularities the person signing.

Additionally, a central EU application as part of the recommended hybrid solution could provide a reference service for this correlation table.

4.6.3 Reports by Member States (Article 51, paragraph 2)

Article 51, paragraph 2 has been replaced by the following text:

Before the end of each calendar year, Member States shall also draw up a report for the previous year, based on the additional reporting questionnaire in Annex IX, and shall send it to the Commission. Within a month of transmission of that report to the Commission, Member States shall also make the section of that report relating to Article 24 and Article 50(1), (2) and (2a), including Table 5 of Annex IX, <u>publicly available</u>, including electronically via the internet, together with any explanation that the Member States consider to be appropriate. The Commission shall compile a list of the Member States' hyperlinks referred to in the section relating to Article 50(2) and (2a) in Annex IX and make it publicly available on its website.

This amendment of the WSR emphasises the importance of having a reliable and complete data available in the system.

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5 PROJECT DESCRIPTION

Based on the analysis, the recommended solution is a hybrid system including the development of a common EDI Protocol.

Herein, the term 'project' refers to implementation of the recommended solution entitled as electronic Transboundary Waste Shipment System (e-TWSS). This section describes the key features of the project, such as the scope, stakeholder's needs, possible constraints and deliverables.

5.1 Scope

5.1.1 Includes ("IN" Scope)

The project would deliver an EDI Protocol that covers the communication between the Competent Authorities of Member States and communication between the Competent Authorities and the Industry.

Additionally, the project would deliver an EU-wide IT system for WSR (e-TWSS) to support the Notification, Movement process and Annex VII of the Waste Shipment Regulation.

5.1.2 Excludes ("OUT" Scope)

The project will not cover modifications needed to the existing National systems to support the new Electronic Data Interchange Protocol.

5.1.3 Scope Statement

An EDI Protocol together with the EU-wide information system for the WSR would be the outputs of the project.

5.2 Success Criteria

Close collaboration between all stakeholders involved and willingness to agree on the common business rules as a precursor for adoption of a common EDI Protocol is one of the key success criteria. Additionally, the EDI Protocol should be defined as technical requirements annex to the Waste Shipment Regulation.

5.3 Stakeholder and User Needs

The following stakeholders have been consulted (the Questionnaire and the interviews) in the course of this study.

- 38 institutions from MS authorities
- 2 institutions from EFTA countries (Norway and Switzerland)
- 3 Customs offices (Bulgaria, Portugal and Germany) Note: Customs of Netherlands, Malta and Greece provided answers jointly with their respective competent authority.
- 4 Industry associations (FEAD, EURITIS, Hazardous Waste Europe, Norwegian Industry Organisation).
- 6 Private waste companies; Note: CINAR S.A., Greece (hazardous waste collector) provided answers for industry-specific questions in a joint response with Greek competent authority
- 3 NGOs/non-for-profit associations (BIR, EEA and IMPEL)
- 4 Private software/IT companies. Note that responses from IT companies are incorporated in the Annex 2 –Review of projects, studies and IT systems.

Noting that all needs as listed in the table below derive from the regulation itself, they are identified as mandatory and of high priority.

Some stakeholders suggested the level of priority to be given to the different WSR processes and related requirements. More specifically, the requirements related to the movement process should have the first priority, the notification –related requirements the second and the Annex VII- related, the third priority.

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Regulatory requirements and needs description

| ID | Need Description |
|-----|--|
| CA | Competent authorities of Dispatch, Destination and Transit |
| 1. | Issue the Notification document (Annex IA) and the Movement document (Annex IB) (in a secure way) to the Notifier by the CA of Dispatch. (Art.4(1)) |
| 2. | Receive the completed Notification document (Annex IA), together with the supporting documentation as listed in Annex II, Part I. |
| ۷. | Receive the completed Movement document (Annex IB) together with the supporting document. (Art. 4(2)) |
| 3. | Check the technical completeness of the submitted Notification.(Art.4(3)) |
| 4. | Request additional information and documentation (if needed) as set out in Annex II, Part 3. (Art.4(3)) |
| 5. | Receive evidence of the contract concluded between the notifier and the consignee at the time of notification. (Art.4(4)) |
| 6. | Approve the financial guarantee or equivalent insurance, including the form, wording and amount of the cover by the CA of dispatch. (Art.6(3)) |
| 7. | In case of import into the Community, the CA of destination shall review the amount of cover and if necessary, approve financial guarantee or equivalent insurance. (Art.4(4)) |
| 8. | MS shall inform the Commission of provisions of national law adopted pursuant to the Art. 6 on Financial guarantee. |
| 9. | Determine if the notification has been properly carried out. (Art.7(1)) |
| 10. | If yes, CA of dispatch retains a copy of the notification and transmits the notification to the CA of destination with copies to any CA of transit. |
| 11. | Inform the notifier of the transmission within 3 working days of receipt of the notification. (Art.7(1)) |
| 12. | If the notification is not properly carried out, the CA of dispatch request information and documentation from the notifier; this shall be done within 3 working days of receipt of the notification. (Art.7(2)) |
| 13. | Once the notification has been properly carried out, the CA of dispatch may decide, within 3 working days, not to proceed with the notification if it has objections to the shipment in accordance to Art. 11 & 12. (Art.7(3) |
| 14. | If not, decision of the evaluation is not to proceed with the Notification due to objections as per Art.11 & Art.12, inform the Notifier of the decision and its objectives (within 3-working days). (Art.7(3)) |
| 15. | Inform the Notifier immediately of its decision and of these objections. (Art.7(3)) |
| 16. | Provide the Notifier with a reasoned explanation (upon his/her request) if within 30 days of receipt of the notification, the CA of dispatch has not transmitted the notification to the all involved CA. (Art. 7(4)) |
| 17. | Request additional information and documentation from the Notifier and inform the other CAs of such request (any of CA concerned). This shall be done within 3 working days following the receipt of the information. (Art.8(1)) |
| 18. | If the CA of destination considers that the notification has been properly completed, it sends an acknowledgement to the Notifier and copies to the other Competent authorities concerned. This shall be done within 3 working days of receipt of the properly completed notification. (Art. 7(2)) |
| 19. | Provide the Notifier (upon his/her request) with a reasoned explanation if within 30 days of receipt of the notification, the CA of destination has not acknowledged the notification as required. (Art. 7(3)) |

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| 20. | Each CA of destination, dispatch and transit will issue one of the types of consents ¹⁷ 30 days within transmission of the acknowledgement by the CA of destination. The consent will contain the conditions and/or objections (if any) which will be also transmitted to the Notifier and all the concerned Competent Authorities. Tacit consent by the CA of transit may be assumed if no objection is lodged within the said 30-day time limit. (Art.9(1)) |
|-----|--|
| 21. | The CA of destination, dispatch, and where appropriate, transit, shall transmit their decision to the Notifier with copies to the other competent authorities. (Art.9(2)) |
| 22. | Issue official notice on withdrawal of the Consent and send the official notice to the Notifier with copies to the other competent authorities concerned and the consignee.(Art.9 (9)) |
| 23. | CA of dispatch, destination and transit may within 30 days following the date of transmission of the acknowledgement lay down conditions (1) in connection with their consent, (2) in respect of the transport of waste within their jurisdiction, (3) that their consent is to be considered withdrawn if the financial guarantee or equivalent insurance is not applicable at least when the notified shipment starts. |
| | These conditions shall be transmitted to the Notifier with copies to the competent authorities concerned. Conditions shall be supplied on, or annexed to, the notification document by the relevant competent authority. (Art.10) |
| 24. | CA of destination may also within 30 day time limit lay down a condition that the facility which receives the waste shall keep a regular record of inputs/outputs and/or balances of waste. (Art.10 (5)) |
| 25. | CA of dispatch and CA of destination raise objections regarding a planned shipment of waste destined for disposal or recovery. This will be done within 30 days following the date of transmission of the acknowledgement of the CA of destination on receipt of the Notification dossier. (Art.11; Art.12) |
| 26. | If problems (which gave rise to objections) have been resolved (within 30-day time) CA of dispatch and CA of destination inform (immediately) the Notifier with copies to the the Consignee and to the other CA concerned. (Art.11(4); Art.12(3)) |
| 27. | If problems (which gave rise to objections) are not resolved the notification shall cease to be valid. In cases where the Notifier still intends to carry out the shipment, a new notification shall be submitted. (Art. 11(5); Art.12(4)) |
| 28. | Member States report to the Commission objections raised by Competent Authorities in accordance with Art. 12(1)(c). Reporting to be done in accordance to Article 51. (Art.12(5)) |
| 29. | The Member States of dispatch informs the Commission on the national legislation on which the raised objections are based on. (Art.12(6)) |
| 30. | Competent Authority of Destination may decide to issue pre-consents to the recovery facility over which has jurisdiction. (Art. 14(1)) |
| 31. | CA of Destination which decides to issue a pre-consent to a facility informs the Commission and OECD (if appropriate) with set of data as specified in Art.14 (a-j) |
| 32. | Keep all the documents in relation to a notified shipment $\underline{at least 3 years}$ from the date when the shipment starts. (Art.20(1)) |
| 33. | The competent authorities of dispatch or destination may make publically available by appropriate means, information on notifications of shipments they have consented to, where such information is not confidential under national or Community legislation. (Art.21) |
| 34. | Any of the competent authorities concerned becomes aware that a shipment of waste, including its recovery or disposal cannot be completed as intended it shall immediately inform the CA of dispatch. Where a recovery or disposal facility rejects a shipment received, it shall immediately inform the competent authority of destination. (Art.22(1)) |
| 35. | CA of dispatch ensure that the waste in question will be taken back by the Notifier; if not practicable, it will be done either by that CA itself of a natural or legal person on its behalf. This shall take place within 90 days or other period as agreed by the competent authorities. (Art.22(2)) |

¹⁷ Pursuant to Article 9(1) issue: a) consent without conditions; b) consent with conditions in accordance with Article 10, or c) consent with objections in accordance with Articles 11 and 12.

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| 36. | In the cases of take-back, a new notification shall be submitted, unless the competent authorities concerned agree that a duly reasoned request by the initial CA of dispatch is sufficient. (Art.22(4); Art. 24(2)) |
|-----|--|
| 37. | Rule: If a new Notification is submitted by the initial competent authority of dispatch (in case of take-back when a shipment cannot be completed as intended/or illegal shipment) a new financial guarantee or equivalent insurance shall not be required. (Art. 22 (7), Art.24(4)) |
| 38. | Competent Authority with jurisdiction over the area where the waste from a shipment that cannot be completed is discovered, needs to ensure that arrangements are made for the safe storage of the waste pending is return or non-interim recovery or disposal in an alternative way. (Art.22(9)) |
| 39. | If a Competent Authority discovers a shipment that is considered to be an illegal shipment, immediately inform the other competent authorities concerned. (Art.24(1)) |
| 40. | If an illegal shipment is the responsibility of the notifier, CA of dispatch shall ensure that the waste in question is handled as per Art. 24 (2). |
| 41. | If an illegal shipment is the responsibility of the Consignee, the CA of destination shall ensure that the waste in question is handled as per Art. 24(3) |
| 42. | In cases where responsibility for the illegal shipment cannot be imputed to either the Notifier or the consignee, the competent authorities concerned shall cooperate to ensure that the waste in question is recovered or disposed of. (Art. 24(5)) |
| 43. | In the case of interim recovery or disposal where an illegal shipment is discovered after completion of the interim recover or disposal operation, the obligation of the country of dispatch to take the waste back shall end when the facility has issued the certificate referred to in Art. 15(d). (Art.24(6)) |
| 44. | Indicate which language for submission of any notification, information, documentation or other communication is acceptable to the competent authorities concerned. (Art.27(1)) |
| 45. | Business rules in case of disagreements between the CA of dispatch and of destination on classification issues pursuant to Article 28: a. the distinction between waste and non-waste, the subject matter will be treated as waste. b. on notified waste as being listed in Annex III, IIIA, IIIB or IV, the waste shall be regarded as listed in Annex IV. |
| | c. on the classification of the waste treatment operation notified as being recovery or disposal; the provisions regarding disposal shall apply. |
| 46. | MS may conclude bilateral agreements making the notification procedure for shipments of specific flows of waste less stringent in respect of cross-border shipments to the nearest suitable facility. Such agreements shall be notified to the Commission before they take effect. (Art.30) |
| 47. | In case of a shipment of waste destined for disposal takes place within the Community with transit via one or more third countries, CA of dispatch shall ask the competent authority in third countries to send its written consent to the planned shipment within 60 days (if parties to the Basel Convention) or within a period agreed (if not parties to the Basel Convention). (Art. 31) |
| 48. | In case of a shipment of waste destined for recovery takes place within the Community with transit via one or more third countries to which the OECD Decision does not apply, Art. 31 shall apply. If transit is via one or more third countries to which the OECD Decision applies, the consent referred in Art.9 may be provided tacitly and if no objections or conditions have been specified, the shipment ma start 30 days after the transmission of the acknowledgement. (Art. 32) |
| 49. | MS shall establish an appropriate system for the supervision and control of shipments of waste exclusively within their jurisdiction. (Art. 33) |
| 50. | For exports from the Community to EFTA countries provisions of Title II- Shipments within the Community with or without transit through third country shall apply with adaptations and additions. (Art.35) |
| 51. | Competent Authority of transit outside of the Community request additional information on the notified shipment, 60 days following the date of transmission of the acknowledgement of receipt of the notification. (Art.35(2)) |
| 52. | CA of dispatch will issue a consent to the shipment only after having received (written) consent from the CA of destination and CA of transit outside the Community (not earlier than 61 days following the date transmission of the acknowledgement by the CA of transit). (Art.35(2)b) |
| 53. | CA of transit in the Community shall acknowledge the receipt of the notification to the notifier. (Art. 35(3a)) |

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| 54. | CA of dispatch and (if appropriate) of transit shell send (a stamped copy) of their decision to consent to the shipment to the customs office of export and to the customs office of exit from the Community. (Art. 35(3b)) |
|-----|---|
| 55. | If, 42 days after the waste has left the Community, the CA of dispatch in the Community has received no information from the facility about the receipt of the waste, it shall without delay inform the CA of destination. (Art.35 (3)) |
| 56. | MS shall inform the envisaged country of destination prior taking a decision to export a specific hazardous waste listed in Annex V that is excluded from the export prohibition. Also, MS shall notify such cases to the Commission before the end of each calendar year. (Art.36(5)) |
| 57. | The first and last Competent Authority of transit in the Community shall send copy of decisions to the shipment OR if they provided tacit consent, a copy of the acknowledgement to the customs office of entry into and exit from the Community. (Art.47; Art.48) |
| 58. | Each Member State needs to prepare and send a copy of Report for the previous year prepared in accordance to Article 13(3) of the Basel Convention. The report will be prepared before the end of each calendar year. (Art. 51(1)) |
| 59. | Each Member State shall also prepare a Report for the previous year based on the additional reporting questionnaire in Annex IX of the WSR. (Art.51(2)) |
| 60. | MS may designate specific customs offices of entry into and exit from the Community for shipments of waster entering and leaving the Community. (Art.55) |
| CU | Customs |
| 1. | As soon as the waste left the Community, customs office of exit shall send (stamped) copy of the movement document to the CA of dispatch in the Community stating that the waste left the Community. (Art.35 (d)) |
| 2. | If a customs office of export or a customs office of exit from the Community discovers an illegal shipment it will without delay inform the competent authority in the country of the customs office. (Art.38(7)) |
| 3. | Ensure detention of waste until receiving decision from the CA of destination. (Art.38(7b)) |
| 4. | Having carried out the necessary customs formalities, the customs office of entry into the Community shall send a copy of the movement document to the competent authorities of destination and transit stating that the waste has entered the Community. (Art.42(d)) |
| WP | Waste Producer/Notifier |
| 1. | Submit a prior written notification to and through the competent authority of dispatch and, if submitting a general notifications comply with Art. 13. When a Notification is submitted the following requirements shall be fulfilled: |
| | Notification (Annex IA) and Movement documents (Annex IB) Information and documentation in the notification document (Annex II, Part 1) and the |
| | movement document (Annex II, Part 2). 3. Additional information and documentation (Annex II, Part 3). 4. Conclusion of a contract between the notifier and the consignee. Evidence of the contract or |
| | movement document (Annex II, Part 2). 3. Additional information and documentation (Annex II, Part 3). 4. Conclusion of a contract between the notifier and the consignee. Evidence of the contract or a declaration certifying its existence in accordance with Annex IA to be supplied to the competent authorities. 5. Establishment of a financial guarantee or equivalent insurance. The financial guarantee shall be supplied as part of the notification document at the time of notification or, if the competent |
| | movement document (Annex II, Part 2). 3. Additional information and documentation (Annex II, Part 3). 4. Conclusion of a contract between the notifier and the consignee. Evidence of the contract or a declaration certifying its existence in accordance with Annex IA to be supplied to the competent authorities. 5. Establishment of a financial guarantee or equivalent insurance. The financial guarantee shall be supplied as part of the notification document at the time of notification or, if the competent authority so allows, at such time before the shipment starts. In case of a general notification pursuant to Article 13, a financial guarantee covering parts of the general notification maybe established, instead of one covering the entire general notification. (Art. 6(8)) 6. Coverage of the notification. A notification shall cover the shipment of waste from its initial |
| 2. | movement document (Annex II, Part 2). 3. Additional information and documentation (Annex II, Part 3). 4. Conclusion of a contract between the notifier and the consignee. Evidence of the contract or a declaration certifying its existence in accordance with Annex IA to be supplied to the competent authorities. 5. Establishment of a financial guarantee or equivalent insurance. The financial guarantee shall be supplied as part of the notification document at the time of notification or, if the competent authority so allows, at such time before the shipment starts. In case of a general notification pursuant to Article 13, a financial guarantee covering parts of the general notification maybe established, instead of one covering the entire general notification. (Art. 6(8)) |

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| 4. | Send request to the CA of dispatch if no acknowledgment on transmission is received within 30 working days from date of receipt of the Notification dossier. (Art.7(4)) |
|-----|---|
| 5. | Send request to the CA of destination if no acknowledgment on notification is received within 30 working days from date of receipt of the Notification dossier by the CA of destination. (Art. 8(3)) |
| 6. | After received consent to a notified shipment, insert the actual date of shipment in the Movement document (Bloc 6 of the Annex IB). (Art.16(a)) |
| 7. | Prior information regarding actual start of shipment: the notifier shall send signed copies of the completed Movement document to the competent authorities concerned and to the consignee at least 3 working days before the shipment starts. (Art.16(b)) |
| 8. | In case of any essential change is made to the details or conditions of the consented shipment, including changes in the intended quantity, route, routing, date of shipment or carrier, the Notifier shall inform the Competent Authorities concerned and the consignee immediately and before the shipment starts. (Art. 17(1)) |
| 9. | Business rule: In such cases a new notification shall be submitted, unless all the competent authorities concerned consider that the proposed changes do not require a new notification. Where such changes involve competent authorities other than those concerned in the original notification, a new notification shall be submitted. (Art. 17(2), (3)) |
| 10. | Keep all the documents in relation to a notified shipment at least 3 years from the date when the shipment starts. (Art.20(1)) |
| 11. | In case of take-back, a new notification shall be submitted unless concerned CA agree that a duly reasoned request by the initial CA of dispatch is sufficient. (Aer.22(4)) |
| 12. | In cases of alternative arrangements <u>outside</u> the initial country of destination, a new notification will be submitted to the CA of the initial country of dispatch. (Art. 22(5)) |
| 13. | Rule: In cases of alternative arrangements in the initial country of destination, a new notification will not be submitted and duly reasoned request shall suffice. (Art.22(6)) |
| 14. | If no new notification to be submitted in accordance to Art. 22, point 4 and 6, a new Movement document shall be completed. (Art. 22 (7)) |
| 15. | The notifier shall provide the competent authorities concerned with authorised translation(s) into a language which is acceptable to them, should they so request. (Art.27(2)) |
| TF | Treatment facility/Consignee |
| 1. | Keep record of inputs, outputs and balances for wastes and related recovery or disposal operations for the period of validity of the notification. (Art.10(5)) |
| 2. | Send (signed) records by a person legally responsible for the facility to the CA of destination within one month of completion of the notified recovery or disposal operation. (Art.10(5)) |
| 3. | Send (written) confirmation within 3 days on waste recipient supplied in or annexed to the Movement document (Bloc 17 of Annex IB)(which will be signed) to the Notifier and all concerned Competent Authorities. (Art.15(c)) |
| 4. | Send (signed) copies of the Movement document together with the Certificate on interim recovery or disposal operations to the Nofier and all concerned Competent Authorities within 30 days but not later than one year after receipt. (Art. 15(d)) |
| 5. | Transmit the relevant certificate(s) from any subsequent interim recovery or non-interim recovery or disposal operation to the Notifier and the Competent authorities concerned identifying the shipment(s) to which the certificate(s) pertain. This will be done within 30 days but no later than 1 calendar year after waste delivery. This needs to be supplied in (Block 18 of Annex IB) or annexed to movement document. (Art.15 (e)) |
| 6. | Send written confirmation within3 day of receipt of the waste supplied in or annexed to the Movement document .(Art. 16 (b)) Signed copies of the movement document containing this confirmation will be send to the notifier and to the competent authorities concerned. |

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| 7. | Send certificate on the non-interim recovery or disposal completion as soon as possible, but not later than 30 days after completion of the non-interim recovery or disposal operation, and no later than one calendar year, or a shorter period in accordance with Article 9(7), following receipt of the waste. (Art. 16(e)) |
|-----|--|
| 8. | Ensure that the waste is accompanied by the document contained in Annex VII. The document shall be signed by the person who arranges the shipment before the shipment takes place and by the recovery facility or the laboratory and the consignee when the waste in question is received. (Art.18(1)) |
| 9. | Keep all the documents in relation to a notified shipment at least 3 years from the date when the shipment starts. (Art.20(1)) |
| 10. | Inform immediately CA of destination in case of rejection of a shipment received. (Art.22(1)) |
| 11. | In case of an illegal shipment, the person who arranges the shipment shall be subject to the same obligations defined in Art.24 as the notifier. (Art. 24(9)) |
| EC | European Commission |
| 1. | The Commission shall forward the information to all MS and to the Secretariat of the Basel Convention in case of export of a specific hazardous waste listed in Annex VI that is excluded from the export prohibition. (Art.36(5)) |
| 2. | The Commission shall establish every three year a report based on the MS annual reports on the implementation of this Regulation by the Community and its MS. (Art.51(4)) |
| 3. | The Commission may adopt in accordance with the regulatory procedure technical and organisational requirements for the practical implementation of the EDI for the submission of documents and information in accordance to Art. 26(4). (Art. 59 (1d)) |

5.4 Deliverables

This study identifies the following deliverables for the project.

| ID | Deliverable Name Deliverable Description | | | | |
|----|---|--|--|--|--|
| 01 | Electronic Data Interchange (EDI) Protocol | Data Exchange Protocol for transboundary waste shipment | | | |
| 02 | the Electronic Transboundary Waste Shipments System (e-TWSS) | An EU-wide IT system for implementation of the Waste Shipment Regulation (alternative of hybrid system). | | | |

5.5 Constraints

The scope of the project is grounded on responses to the questionnaire coupled with the stakeholders feedback received during the consultation period. This implies implementation of the EDI Protocol as part of the recommended hybrid system.

The scenario and approach suggested (See section 6) will have to be confirmed by the MSCA as they would need to allocate the necessary financial and human resources for the project.

5.6 Risks

The project identifies the following risk factors:

| ID | Risk Description |
|-----|--|
| RO | Lack of agreement on the decision-making process between the MSCA in order to reach decision on the EDI Protocol and future EU-wide IT solution for WSR. |
| R01 | Delays with definition of the data exchange specifications as a basis for implementation of the EDI protocol. |
| R02 | MSCA with existing IT systems in place would need to adopt their existing systems in case of the recommended hybrid system. This would have impact on the financial and human resources of the MSCA. Lack of resources could jeopardise the implementation of the project. |

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| ID | Risk Description |
|-----|--|
| R03 | Delays with the project implementation of the EU-wide IT solution for WSR due to lack of agreement between the MSCA on the selected architecture scenario. |

6 Cost, Timing and Resources

For each of the proposed alternatives/systems (i.e. centralised, decentralised and hybrid), this section describes high-level cost estimates, incl. Commission-related and MS-related. These cost estimates are based on the contractor's experience with the implementation of similar systems (e.g. REACH IT system for the European Chemicals Agency¹⁸, IT systems for the EU ETS Directive¹⁹, etc.)

6.1 Costs

Assumptions:

The following assumptions were taken into account for the cost estimation:

- The development costs are comprised of the following components:
 - Preparation of the documentation (business requirements, functional specifications, technical specifications, System design document) (~25%)
 - Design and build of the centralised system (~50%)
 - Testing tools (ICT hardware/software and/or additional licences) (~25%)
- The maintenance costs are limited to the evaluative maintenance (5% of development costs) plus corrective maintenance (5% of development cost), total of 10% of the development costs.
- **Costs on support** (10% of development cost) cover all support activities provided by the operations contractor being the testing, support in conformance testing, service support.
- · Costs on training
- Costs on infrastructure

All estimated costs are expressed in Euros (€) for a 5-year period, i.e. from 2015-2019. It should be noted that some costs (e.g. maintenance and support costs) may well extend beyond 2019. Once the agreement is reached on the selected system, detailed budget estimations should be part of the project implementation plan.

It is hereby assumed that Member States already having a national IT system for WSR would bear the costs for the development and maintenance of an adapter. However, the Commission could look further into the options of supporting MS for the development of an adapter.

6.1.1 Estimated costs for Centralised system

General description:

As describe in the Section 3, this alternative does not foresee a need for a Communication protocol since all users will access one, centralized application.

However, it is required to define and document the business process (e.g. Business requirements; Functional specifications), which will require set up of the Business Implementation Group composed of the MSCA experts, Industry, experts, etc.

In this scenario, the Commission will bear the costs for development maintenance, support and infrastructure of the solution.

Commission-related

| Costs (€)/ | 2015 | 2016 | 2017 | 2018 | 2019 | TOTAL (€) |
|-------------|---------|---------|--------|--------|--------|-----------|
| Year | (€) | (€) | (€) | (€) | (€) | |
| Development | 800 000 | 150 000 | - | - | - | 950 000 |
| Maintenance | - | 80 000 | 80 000 | 80 000 | 80 000 | 320 000 |
| Support | - | 80 000 | 80 000 | 80 000 | 80 000 | 320 000 |

¹⁸ http://echa.europa.eu/web/guest/support/dossier-submission-tools/reach-it

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¹⁹ http://ec.europa.eu/clima/policies/ets/registry/index_en.htm

| Costs (€)/ Year | 2015 (€) | 2016 (€) | 2017 (€) | 2018 (€) | 2019 (€) | TOTAL (€) |
|--------------------|-------------|-------------|-------------|-------------|-------------|-----------|
| Training | - | 250 000 | - | - | - | 250 000 |
| Infrastructure | 50 000 | 50 000 | 50 000 | 50 000 | 50 000 | 250 000 |
| TOTAL | 850 000 | 610 000 | 210 000 | 210 000 | 210 000 | 2 090 000 |

MS -related

Trainings costs would be shared between the Commission for its users (administration, preparation of the training material) and MSCA for organising trainings for its national users (authority staff, industry, etc.). It should be foreseen that at least:

A few (~ 5) workshops (3 days each) should be organised at the Commission to train MSCAs

2 workshops (3 days each) at each MS should take place during roll-out of the system to train local users and industry. The training budget should be split:

- 50 000 € to prepare training material
- 5000€ per workshop (either in Commission or at a MS); and minimum of 40 workshops to be organised.

6.1.2 Estimated Costs for Decentralised system

General description:

A decentralised scenario for an EU-wide IT system for WSR requires preparation of the Data Exchange Specifications, design and development of the Electronic Data Interchange (EDI) Protocol. Development of the EDI protocol will be preceded by the preparation of the business process documentation (e.g. Business requirements).

With regard to the system design and development costs, main impact will be on the MSCA as they would need either to implement the adapter/upgrade module for their existing IT system or develop their own IT system for WSR, unless the Commission implements an open source National Reference Application (NRA).

Training costs would be mainly on the MSCA as they would need to organise and implement sessions for its stakeholders using MSCA specific IT systems.

Additionally, each MSCA needs to foresee annual costs for consequent developments aligned with the EDI protocol developments, maintenance, operational support and infrastructure-related costs.

6.1.2.1 Option 1: Option 1: Decentralised system with development of National Reference Application (NRA)

In case the Commission decides to develop an open source National Reference Application to be used by MS not having a system in place, the following would be costs implications:

Commission-related

The Commission estimated costs are primarily one-time costs necessary for design and development of the following elements:

- National Reference Application that would be given to the MS currently without an IT system in place
- EDI Protocol as communication channel between all involved entities
- Reporting module (as there is no central hub for 'collecting & consolidating' data from involved
 entities in transboundary waste shipments) in order to have consolidated data for reporting and
 monitoring purposes of the Commission.
- Preparation of training material for implementation of the NRA.

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| Costs (€)/ Year | 2015 (€) | 2016 (€) | 2017 (€) | 2018 (€) | 2019 (€) | TOTAL (€) |
|---|-------------|-------------|-------------|-------------|-------------|--------------|
| Development of the National Reference Application (NRA) for MSCAs to reuse & Reporting module | 800 000 | 200 000 | - | - | - | 1 000 000 |
| Maintenance | - | 80 000 | 80 000 | 80 000 | 80 000 | 320 000 |
| Support | - | - | - | - | - | |
| Training | - | 50 000 | - | - | - | 50 000 |
| Infrastructure (for reporting module only) | 50 000 | 50 000 | 50 000 | 50 000 | 50 000 | 250 000 |
| TOTAL | 850 000 | 380 000 | 130 000 | 130 000 | 130 000 | 1 620 000 |

MS-related

The maintenance, support (helpdesk, technical support) and infrastructure related costs to its own IT application would be responsibility of each MSCA. This means that each of 28 MSCA would need resources for annual operational costs. Moreover, using a decentralised approach the secure communication channels between each MS with every other MS should be foreseen and this would increase significantly the local infrastructure costs, compared to the other 2 solutions.

Additionally, MSCA will be responsible for organisation and implementation of the trainings.

| Costs (€)/ Year | 2015 (€) | 2016 (€) | 2017 (€) | 2018 (€) | 2019 (€) | TOTAL (€) |
|-----------------------------|-------------|-------------|-------------|-------------|-------------|--------------|
| Development/ | - | - | | | | |
| implement.1 | | | | | | |
| Maintenance ² | - | 50 000 | 50 000 | 50 000 | 50 000 | 200 000 |
| Support ² | - | 50 000 | 50 000 | 50 000 | 50 000 | 200 000 |
| Training ³ | - | 60 000 | - | - | - | 60 000 |
| Infrastructure ⁴ | Local IT | |
| | costs | costs | costs | costs | costs | |
| TOTAL ⁵ | | 160 000 | 100 000 | 100 000 | 100 000 | 460 000 |

¹This is a national and non-deterministic cost to be foreseen. It will depend on whether a MSCA just reuses the National Reference Application implementation, and thus not incurring additional costs, or whether a MSCA has local/regional needs requiring it to implement its own system plus the adapter module. The latter case may have a high budget requirement.

6.1.2.2 Option 2: Decentralised system without development of National Reference Application (NRA)

If the Commission decides not to provide the National Reference Application (NRA) and only to implement EDI Protocol for communication, then each MS would need to develop their own application. In this case the costs implications are the following:

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²The 50 000 estimate is just for maintaining & supporting the NRA implementation. For a more enhanced and independent national solution, additional budget should be foreseen.

³ The MS should foresee at least 2 workshops (potentially more) to train locally the users. Each workshop should be budgeted ~ 5000€. Additionally, training material should be also prepared (~ 50 000€)

⁴ Local IT infrastructure costs are specific for each MS depending on whether the infrastructure is shared, dedicated, or other.

⁵ Total costs presented do not include local IT infrastructure costs.

Commission-related:

The Commission would be responsible for the design and development of the elements shown further below. In case a reporting module is considered, it is foreseen that additional costs will incur such as for maintenance, support and infrastructure.

| Costs (€)/ Year | 2015 (€) | 2016 (€) | 2017 (€) | 2018 (€) | 2019 (€) | TOTAL (€) |
|---|-------------|-------------|-------------|-------------|-------------|-----------|
| EDI Protocol | 150 000 | 50 000 | | | | 200 000 |
| Reporting module (optional) | (150 000) | (35 000) | | | | (185 000) |
| Maintenance | | (20 000) | (20 000) | (20 000) | (20 000) | (80 000) |
| Support | | (20 000) | (20 000) | (20 000) | (20 000) | (80 000) |
| Infrastructure | (50 000) | (50 000) | (50 000) | (50 000) | (50 000) | (250 000) |
| TOTAL (with reporting module) | 350 000 | 175 000 | 90 000 | 90 000 | 90 000 | 795 000 |
| TOTAL (without reporting module) | 150 000 | 50 000 | | | | 200 000 |

MS-related:

Each MS would be faced with significant costs related to design and development of its own national application. Additionally, costs for hosting, maintenance, support and training would need to be accounted as well.

| Costs (€)/ Year | 2015 (€) | 2016 (€) | 2017 (€) | 2018 (€) | 2019 (€) | TOTAL (€) |
|---|-------------------|-------------------|-------------------|-------------------|-------------------|-----------|
| Development/ implement its own national application | 600 000 | 150 000 | - | - | - | 750 000 |
| Maintenance | - | 80 000 | 80 000 | 80 000 | 80 000 | 320 000 |
| Support | - | 80 000 | 80 000 | 80 000 | 80 000 | 320 000 |
| Training ¹ | - | 60 000 | - | - | - | 60 000 |
| Infrastructure ² | Local IT costs | |
| TOTAL ³ | 600 000 | 370 000 | 160 000 | 160 000 | 160 000 | 1 450 000 |

¹The MS should foresee at least 2 workshops (potentially more) to train locally the users. Each workshop should be budgeted ~ 5000€. Additionally, training material should be also prepared (~ 50 000€).

6.1.3 Estimated Costs for a Hybrid solution

Estimates for the Commission and MS-related costs are given for two possible options for a Hybrid solution:

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² Local IT infrastructure costs are specific for each MS depending on whether the infrastructure is shared, dedicated, or other.

³ Total costs presented do not include local IT infrastructure costs.

6.1.3.1 Hybrid system with a simplified central component called the Central EU router

In this option, the Commission would support the development and implementation of a simplified central EU Node called the central EU router, while each Member State is required to provide and operate their own IT system.

Commission-related:

The Commission would be responsible for the design and development of the following elements:

| Costs (€)/ Year | 2015 (€) | 2016 (€) | 2017 (€) | 2018 (€) | 2019 (€) | TOTAL (€) |
|---|-------------|-------------|-------------|-------------|-------------|--------------|
| EDI Protocol | 150 000 | 50 000 | | | | 200 000 |
| Reporting module (optional) | (150 000) | (35 000) | | | | (185 000) |
| Central EU router | 150 000 | 35 000 | | | | 185 000 |
| Maintenance | | 50 000 | 50 000 | 50 000 | 50 000 | |
| Support | | 50 000 | 50 000 | 50 000 | 50 000 | |
| Training | - | - | - | - | - | |
| Infrastructure | 50 000 | 50 000 | 50 000 | 50 000 | 50 000 | |
| TOTAL (with reporting module) | 500 000 | 270 000 | 150 000 | 150 000 | 150 000 | 1 220 000 |
| TOTAL (without reporting module) | 350 000 | 235 000 | 150 000 | 150 000 | 150 000 | 1 035 000 |

MS-related

Each MS would be faced with significant costs related to design and development of its own national application. Additionally, costs for hosting, maintenance, support and training would need to be accounted as well.

| Costs (€)/ | 2015 | 2016 | 2017 | 2018 | 2019 | TOTAL (€) |
|--|----------------|-------------------|-------------------|-------------------|-------------------|-----------|
| Year | (€) | (€) | (€) | (€) | (€) | |
| Development/ | 600 000 | 150 000 | - | - | - | 750 000 |
| implement its own national application | | | | | | |
| Maintenance | - | 80 000 | 80 000 | 80 000 | 80 000 | 320 000 |
| Support | - | 80 000 | 80 000 | 80 000 | 80 000 | 320 000 |
| Training ¹ | - | 60 000 | - | - | - | 60 000 |
| Infrastructure ² | Local IT costs | Local IT costs | Local IT costs | Local IT costs | Local IT costs | |
| TOTAL ³ | 600 000 | 370 000 | 160 000 | 160 000 | 160 000 | 1 450 000 |

¹The MS should foresee at least 2 workshops (potentially more) to train locally the users. Each workshop should be budgeted ~ 5000€. Additionally, training material should be also prepared (~ 50 000€).

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² Local IT infrastructure costs are specific for each MS depending on whether the infrastructure is shared, dedicated, or other.

³ Total costs presented do not include local IT infrastructure costs.

6.1.3.2 Option 2: Hybrid system with an elaborate central component called the Central EU application General description

The hybrid scenario takes the best characteristics of the previously described two other scenarios (centralised and decentralised). This scenario foresees the development of the following elements:

- The EDI Protocol as a communication channel
- Central EU application acting as a hub for all national domain systems for appropriate message routing and facilitating monitoring and reporting requirements
- Shared MS application that can be accessed by all parties of MS that either don't have an existing solution or don't want to invest in one
- Adapter module for the existing National applications (if in place)

Commission-related:

It is recommended that the Commission would finance definition, design and development of the EU central application, Shared MS application and a common EDI Protocol. Also, maintenance, support and infrastructure-related costs to these elements would be covered by the Commission.

| Costs (€)/ Year | 2015 (€) | 2016 (€) | 2017 (€) | 2018 (€) | 2019 (€) | TOTAL (€) |
|--------------------|-------------|-------------|-------------|-------------|-------------|--------------|
| Development | 900 000 | 300 000 | - | - | - | 1 200 000 |
| Maintenance | - | 100 000 | 100 000 | 100 000 | 100 000 | 400 000 |
| Support | - | 100 000 | 100 000 | 100 000 | 100 000 | 400 000 |
| Training | - | 250 000 | - | - | - | 250 000 |
| Infrastructure | 50 000 | 50 000 | 50 000 | 50 000 | 50 000 | 250 000 |
| TOTAL | 950 000 | 800 000 | 250 000 | 250 000 | 250 000 | 2 500 000 |

MS -related

The MSCA would need to finance the development of an adapter module for its own national IT system for WSR (if one is in place) and cover the costs for the infrastructure, maintenance and support of its own national system. However, the Commission could look further into the option of supporting MS for the development of an adapter. This should be considered similar as the MSCA-related case of the decentralised system (Option1) described above.

The option of a hybrid system with an elaborated central component (central EU application) but without a Shared MS application is not taken into account for the following reasons:

- The development of the Central EU application is approximately 50% of the estimated costs of the recommended Hybrid solution.
- In case of a later decision to develop a shared MS application, there is no guarantee that the
 central EU application could be used 'as-is'. In most cases it would need to be revisited in terms
 of the development.

Therefore, this study considers that an investment on developing a Central EU application without a Shared MS application could turn out as a lost investment.

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Overview of the Commission-related costs for the different alternatives

| Alternative Number & | Topology | Options within the proposed | Tota | Reporting module | |
|---|---|---|---|---|--|
| Name | | alternative | Fixed costs (€) | Annual costs (€) | costs (€) |
| Alt.1: Do Nothing | Not applicable | Not applicable | Not applicable | Not applicable | Not applicable |
| Alt. 2: Central system | Single, central EU application | Not applicable | 950 000 (development) 250 000 (training) | 80 000 (maintenance) 80 000 (support) 50 000 (infrastructure) | Costs included in development costs |
| Alt. 3: Decentralised system Solution comprises of indivinational applications that | application. Solution comprises of individual national applications that | Option 3.1: National Reference Application (NRA) + MS national applications | 1 000 000 (development) 50 000 (training) | 80 000 (maintenance) 50 000 (infrastructure) | Costs included in the fixed costs for NRA development |
| | communicate between each other with the use of a commonly accepted EDI Protocol. | Option 3.2: Only MS national applications | 200 000 (EDI Protocol) | | Additional costs for the optional case of a reporting module: Fixed: 185 000 Annual: 90 000 (maintenance, support, infrastructure) |
| br ce ap as m: | The hybrid approach attempts to bridge the gap between the centralized and decentralized approaches by keeping the best aspects of both without their main problems. (Recommended solution) | Option 4.1: Simplified hybrid system with a central EU router + MS national applications | 200 000 (EDI Protocol) 185 000 (Central EU Router) | 50 000 (maintenance) 50 000 (support) 50 000 (infrastructure) | 185 000 (Optional) |
| | | Option 4.2: Elaborate hybrid system with enriched central EU application + MS existing National applications + Shared MS application. | 1 200 000 (development) 250 000 (training) | 100 000 (maintenance) 100 000 (support) 50 000 (infrastructure) | Costs included in development |

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Overview of costs for each Member State for the different alternatives

| Alternative Number & | Topology | Options within the proposed | 1 | Reporting module | |
|--|--|---|--|--|----------------|
| Name | | alternative | Fixed costs (€) | Annual costs (€) | costs (€) |
| Alt.1: Do Nothing | Not applicable | Not applicable | Not applicable | Not applicable | Not applicable |
| Alt. 2: Central system | Single, central EU application | Not applicable | 60 000 (training) | | Not applicable |
| Alt. 3: Decentralised system Solution comprises of individual national applications that communicate between each other with the use of a commonly accepted EDI Protocol. | Option 3.1: National Reference Application (NRA) + MS national applications | 60 000 (training) | 50 000 (maintenance) 50 000 (support) | Not applicable | |
| | other with the use of a commonly | Option 3.2: Only MS national applications | 750 000 (development) 60 000 (training) | 80 000 (maintenance) 80 000 (support) | Not applicable |
| 1 1 3 | The hybrid approach attempts to bridge the gap between the | Option 4.1: Simplified hybrid system with a central EU router + MS national applications | 750 000 (development) 60 000 (training) | 80 000 (maintenance) 80 000 (support) | Not applicable |
| | centralized and decentralized approaches by keeping the best aspects of both without their main problems. (Recommended solution) | Option 4.2: Elaborate hybrid system with enriched central EU application + MS existing National applications + Shared MS application. | | Local IT costs | Not applicable |

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7 APPROACH

The following approach is proposed for the project implementation:

First step: Definition of a common EDI Protocol.

The preparation of the Data Exchange Specifications (DES) is a starting point for the development of a common EDI Protocol. The specifications would contain all details of the common interface, from a technical perspective, participating systems should adhere to.

Article 26(4) of the WSR provides a legal basis for the definition and development of a common EDI Protocol.

Second step: Agreement on the decision-making process between the Member States

During the stakeholders consultation process, the need was highlighted for defining the structure and procedure for a decision-making process between the MSCA in order to reach an agreement on a common EDI Protocol and the future EU-wide IT system for the WSR. It should be noted that the definition of the process itself has not been examined by this study, as this task falls outside its scope..

Third step: Decision on the architecture scenario for the EU-wide IT system for WSR (e-TWSS)

Once the decision-making process has been defined, it will be necessary to document the decision reached on the selected architecture scenario for e-TWSS.

Fourth step: Pilot project for e-TWSS

Depending on the selected architectural scenario, it is suggested to implement first a pilot project with a selected number of participating countries before the full implementation at the EU level.

If a central and/or hybrid scenario is selected, the system could be developed and rolled out in the selected number of MS. In case of a decentralised scenario, it is suggested that the Commission defines test cases for the MSCA.

Fifth step: Decision on full implementation of the e-TWSS

Based on the outcome of the previous step, a decision can be taken regarding the full implementation of the system within a defined timeframe.

7.1 Methodology

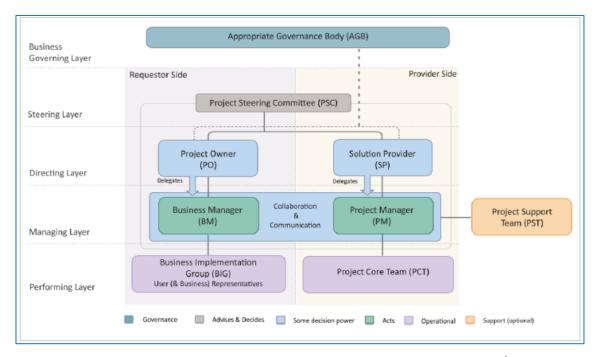
The project follows the PM² project methodology of the European Commission.

8 GOVERNANCE AND STAKEHOLDERS

8.1 Structure

The project governance structure may involve the following roles:

- Project Steering Committee
- Project Owner (PO)
- Solution Provider (SP)
- Business Manager (BM)
- Project Manager (PM)
- Project Core Team (PCT)
- Business Implementation Group (BIG) (User & business representatives)



Source: PM²Methodology

8.2 Roles and Responsibilities

The roles and responsibilities of the governance structure are defined as follows:

The **Project Steering Committee** would be composed of the permanent members (PO, SP, BM, PM) and optional members, such as User representatives, Contractor's Project Manager (CPM), etc.

Typical responsibilities:

- Champions the project, raising awareness at senior level
- Guides and promotes the successful execution of the project at a strategic level
- Provides high level monitor and control of the project
- Authorises plan deviations, scope changes with high project impact and decides on recommendations.
- Arbitrates on conflicts and negotiates solutions to important problems
- Drives and manages change in the organisation
- Ensures adherence to organisation policies and directions
- Approves and signs-off all key management milestone artefacts (Business Case, Project Charter, Project Handbook, Project Work Plan, etc.).

The **Project Owner** (PO) could be Head of the Waste management and Recycling unit at DG Environment.

Typical responsibilities:

- Chairs the Project Steering Committee (PSC)
- Owns the project risks and assures proper project outcomes are in-line with business objectives and priorities.
- Mobilises the necessary resources for the project in accordance to the budget.
- Monitors project progress regularly.
- Provides leadership and strategic direction to the Business Manager (BM) and Project Manager (PM).
- Coordinates resolution of issues and conflicts.
- Ensures that the project outcome meets the business expectations.
- Drives organisation change, mobilises necessary resources and monitors proper evolution and change implementation.
- Approves and signs-off all key management milestone artefacts (Business Case, Project Charter Document, Project Work Plan, etc.).

The **Business Manager** (BM) could be a Policy officer from DG Environment's unit dealing with issues of waste management.

Typical responsibilities:

- Assists the Project Owner (PO) on the specification of the project and the main business objectives.
- Communicates with the User Representatives (UR) and acts as a liaison towards the provider organisation.
- Establishes and guarantees an efficient collaboration and communication channel with the Project Manager (PM).
- Manages the business (requestor) side activities of the project.
- Leads the implementation of the business changes within the users DG as defined by the project objectives.
- Ensures that the business organisation is ready to accommodate and employ the final project product once delivered from the provider organisation.
- Coordinates the schedule and delivery of user training (and production of necessary user support material).
- Devises the best track for business change or reengineering actions, when needed.
- Establishes the Service Level Agreement (SLA) on behalf of the business organisation and the
 users.

The Solution Provider could be Head of the IT Department at DG Environment

Typical responsibilities:

- Assumes the overall accountability for project deliverables and services requested by the Project Owner (PO).
- Represents the interests of those designing, delivering, procuring, and implementing the project's deliverables.
- Agrees on objectives for the supplier activities and approves the contractor's deliverables for the project (if applicable).
- Mobilises the needed resources from the supplier side.

The **Project manager** would be a responsible manager from the IT Department of DG Environment Typical responsibilities:

- Proposes and executes the project plans as approved by Project Steering Committee (PSC).
- Daily manages and coordinates the Project Core Team (PCT) activities and resources.
- Ensures that project objectives are achieved within the quality, time, and cost objectives.
- Manages stakeholder's expectations.
- Ensures that all key management milestone artefacts are delivered and approved by the Project Owner (PO)
- Communicates and reports project progress to the Project Steering Committee (PSC)
- Performs risk management for project related risks.
- For IT Projects: ensures the interoperability and integration of the different project related IT deliverables, systems, services and applications.

The **Business Implementation Group (BIG)** would be composed of the competent authorities' experts from selected number of Member States (4-5). This group would be responsible for business inputs for definition of EDI and the future system, participation in the redesign or updating of any affected business processes.

Typical responsibilities:

- Under the coordination of the Business Manager (BM), the Business Implementation Group (BIG) plans and implements the activities needed to achieve the desired business changes.
- Participates in the redesign or updating of any affected business processes.
- Implements organisational change activities that fall under the scope of the project.

The **Users Representatives** would be also part of the BIG group and would include representatives of the Industry companies and associations.

Typical responsibilities:

- Help define business needs and requirements.
- Ensure that the project specifications and deliverables meet the needs of all users.
- Approve on behalf of the users the project specification, and acceptance criteria.
- Communicate and prioritise user opinions on Project Steering Committee (PSC) decisions on whether to implement recommendations on proposed changes.
- Sign-off documents related to the users (documentation, requirements, etc.).
- Perform the user acceptance tests.
- Participate in demonstrations and pilot phases as needed.
- May also play the role of the Data Owner (when applicable).

The Contractors Project Manager (CPM) would lead the contractor's staff on the project.

Typical responsibilities:

- To guarantee the successful completion and delivery of the subcontracted activities.
- To plan, control and report on the production of deliverables.
- To ensure that all work is performed to the agreed standards and quality set by the DG concerned.
- To collaborate closely with DG's Project Manager (PM).

9 CONCLUSIONS/RECOMMENDATIONS

- The establishment of an Electronic Data Interchange Protocol for the Waste Shipment regulation (WSR) is a feasible task from a technical point of view. Cooperation between Member States and willingness to find a common ground is key to the success of this task.
- The recommended IT architecture for the establishment of an EU-wide IT solution for the WSR is the so-called Hybrid system with an elaborate central component (Alternative 4, Option 2) and EDI Protocol.
- The Hybrid system with an elaborate central component (Alternative 4, Option 2) is comprised of the following elements:
 - o A central EU application
 - National MS applications for countries already having or planning to develop their own application for the WSR
 - A shared MS application to be developed by the Commission for 14 MS not having any IT solution in place.
- Based on the contractor's experience with similar systems (e.g. REACH IT system for the European Chemicals Agency; IT system for the implementation of the EU ETS Directive for DG ENV, etc.) the following fixed and annual costs are estimated (fixed costs for the application development and training costs and annual costs for maintenance, support and infrastructure-related IT costs) with the exclusion of MS-related local infrastructure IT costs as these would depend on the type of infrastructure (e.g. dedicated, shared or other):
 - o The Commission-related costs: 1 450 000€ fixed costs and 250 000€ annual costs
 - MS-related costs would include local infrastructure IT costs and costs for the development and maintenance of an adapter. However, the Commission may look further into the option of supporting MS for developing an adapter.
- For the project implementation, the following stepwise approach is recommended:
 - o Step 1: Definition of a common EDI Protocol
 - o Step 2: Agreement on the decision-making process between the Member States
 - Step 3: Decision on the architecture scenario for the EU-wide IT system for the WSR (e-TWSS).
 - Step 4: Pilot project for e-TWSS
 - Step 5: Decision on full implementation of the e-TWSS

APPENDIX 1: REFERENCES AND RELATED DOCUMENTS

| ID | Reference or Related Document | Source or Link/Location |
|----|---|--|
| 1 | REGULATION (EC) No 1013/2006 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 14 June 2006 on shipments of waste | http://eur-lex.europa.eu/legal- content/EN/TXT/PDF/?uri=CELEX:32006R1013& from=EN |
| 2 | European Parliament legislative resolution of 17 April 2014 on the proposal for a regulation of the European Parliament and of the Council amending Regulation (EC) No 1013/2006 on shipment of waste (COM(2013)0516 – C7-0217/2013 – 2013/0239(COD)) (Ordinary legislative procedure: first reading) | http://www.europarl.europa.eu/sides/getDoc.d o?pubRef=-//EP//TEXT+TA+P7-TA-2014- 0452+0+DOC+XML+V0//EN#BKMD-13 |
| 3 | DG TAXUD, Single Window at Community level WORKING DOCUMENT: TAXUD/1241/2005 — Rev. 5 | http://ec.europa.eu/taxation_customs/resource s/documents/customs/policy_issues/e- customs_initiative/ind_projects/single_window. pdf |
| 4 | Relevant studies, projects and systems studied | See Annex 2-Review of IT systems, projects and studies. |