Final version

REPORT ON RECOMMENDATIONS FOR UPGRADING AND IMPROVEMENT OF THE SWIS AND CFM

Project "Solid Waste Data Collection in South East Europe"
Supported by:

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1. Background

Preparation of the recommendations for upgrading and improvement of the SWIS and CFM is an assignment defined by the ToR for Regional Expert and is to be delivered in the scope of the Work Package 2 of "Project Solid Waste Data Collection in SEE" which is implemented by consortium of partners consisting of NALAS, Aquasan and SeSWA and supported by GIZ ORF Modernization of Municipal Services and Swiss Agency for Development and Cooperation SDC.

SWIS – Solid Waste Information System and CFM – Cost and Finance Model are tools intended for practitioners and decision makers in public utilities and local authorities alike in SEE countries developed by NALAS Task Force for Solid Waste and Water Management. Development of these tools was supported by GIZ Open Regional Fund – Modernization of Municipal Services during period 2010-2013.

SWIS is excel based workbook (for the versions 2003 and 2007) consisting of nine spreadsheets for entering and analysis of solid waste data including sheet with 44 different solid waste indicators calculated automatically. SWIS model was designed as a support tool for tariff setting, waste stream scenarios analysis, investments, strategic planning and other important waste related decision making at the local level. It was promoted in the scope of SWIS project during 2011 but later it wasn't used to the extent that was intended and desired. This mostly due to the lack of reliable data and information channels in the SEE region, but also because of lack of the capacities at the local level and strict legal requirements.

CFM is a web-based modeling instrument helping the municipalities in assessing the costs of the provision of household waste collection. It also possesses a set of indicators that are calculated and compared to the average ranges from the existing CFM database. Its main purpose is to identify and allocate specific costs to appropriate waste management processes i.e. specific units (cost centers) within PUC. Similar to SWIS this online model hasn't been used to the full extent for the same reasons but also due to problems with the servers.

Work Package 2 of the Project envisages upgrading and adjusting of SWIS and CFM tools to fit the reporting needs of municipalities in participating countries in the Project as well as increasing local capacities for their use through tailored trainings. Project partners were supposed to formulate remarks and findings on SWIS and CFM base on experience from data entering in selected municipalities and testing of the models. Respective sources of findings are: **GIZ IMPACT, GIZ SMS Kosovo, SeSWA, Aquasan, Report from SWIS&CFM basic training Sarajevo, Report for Advance training on SWIS and CFM models for Aquasan stuff in Bihac, Report from the meeting of the Platform held in Bihac.** The remarks and findings together with Regional Expert analysis are bases for this report.

According to ToR and Work Package 2 the Draft version of the Report was submitted to NALAS and distributed to all project parents as well as NALAS TF on Solid Waste and Water management for comments. Final version of the Report consist additional appendixes with feedback from respective members. However just several comments have been received and mostly for SWIS model and few for CFM model due to consistent problem with web based software. The testing of CFM model in pilot municipalities was performed on excel work file. Some of the comments where found useful and applied by Regional expert.

2. Solid Waste Indictors

By the nature, indicators are intended to help local authorities and managers to come up with informed decisions based on facts from the field. In this respect waste management is no different than any other investment or service field. Choosing right set of indicators for decision makers of different levels could be an important factor for setting relatively successful strategic goals or making reliable investment decisions. As a part of the SWIS and CFM tools they are there to help get objective picture of the solid waste management state. On the other hand if fed with unreadable "improved" data or estimates can lead wrong conclusions which then can prevent actions.

Both SWIS and CFM provided by reliable data can produce range of different waste management indicators that are intend to serve local (municipal administration or PUC) planers, regulators or decision makers as a basis for planning further steps on improvement of municipal waste management in their communities.

SWIS produces 44 different indicators by which it intends to assess most important waste management related issues like: quantity of waste generated; quantity of collected waste, composition of mixed municipal waste, amount of separation achieved; treatment and disposal; cost and efficiency of the service. Indicators are distributed in seven categories per waste management segment and can be compared to average value ranges taken for literature. It would be interested to consider if such a division is practical from the decision making stand point or it needs to be reconsidered to match managerial needs.

CFM online model consists of four tabs out of which three are intended for data entry and fourth and final is reserved for indicators. The indicators are meant to show how big the costs of waste management service provision are and how these costs are distributed between specific waste management activity groups. Indicator tab summarizes all the work from previous three tabs. It extracts the cost data and displays it in the form of four groups of indicators given in local currency as well as in Euros.

Presentation of indicators per category can be significant for the decision making process therefore they are listed below as given by SWIS and CFM.

2.1. SWIS indicators

I Municipal Waste Collection and Transport	
1	Total population /households served
2	Service coverage urban areas
3	Service coverage rural areas
4	AVERAGE waste collected household/ kg/day

5	AVERAGE household waste collected per capita/ kg/day
6	Quantity of waste collected annually per SWM employee/tons
7	Population served per SWM Employee
8	Employees in SWM per 1000 population served
9	Employment ratio administrative to operative employees
10	SUM Collection Volume provided in m3
11	Service Volume required in m³ under current collection rate
12	Service Volume required in m³ under 100% collection rate
13	Ratio between provision and requirement under current collection rate
14	Ratio between provision and requirement under 100% collection rate

II Municipal Waste Quantities	
15	Estimated total waste generated in tons/year
16	Quantity of waste collected annually in tons
17	Estimated uncontrolled waste disposal in tons/year
18	Uncontrolled waste disposal in % of total generated
19	Uncontrolled waste disposal in % of total collected

III Municipal Waste Depositing on Landfill without Separation	
20	Municipal waste deposited without separation on *traditional landfill* in %
21	Municipal waste deposited without separation on *controlled landfill* in %
22	Municipal waste *incinerated* without separation %

IV Municipal Waste Depositing After Separation	
23	Deposited on landfill after separation in % of collected
24	Average household waste deposited per capita/ kg/day
25	Separated in % of total collected
26	Average household waste separated per capita/ kg/day

V Municipal Waste Recovery after Separation	
27	% out of total separated waste recycled and marketed including stocks
28	% out of total separated waste incinerated with energy recovery
29	% out of total separated waste composted

VI Landfill Usage Capacity	
30	Present landfill capacity used to date
31	Landfill lifetime - years left at present depositing rate without separation or incineration
32	Landfill lifetime - years left after separation, recycling and recovery
33	Average waste deposited in tons per day before separation
34	Average waste deposited in tons per day after separation

VII Current Cost, Planned Investments and Estimated Cost in Euro	
	Per ton
35	Current Waste Collection and Transport Cost Euro/ton
36	Estimated increase in collection and transport cost per ton in Euro
37	Estimated cost of collection and transport including increase for investments in equipment in Euro/ton
38	Estimated increase in expenditures for investment in recycling, recovery and landfilling of collected quantities in Euro/ton

39	Estimated total cost of SWM (collection, transport, treatment and landfilling) with increase for investments in Euro/ton
	Per Household
40	Current Collection and Transport Cost Household/Year in Euro
41	Estimated increase in collection and transport cost per Household/Year in Euro
42	Estimated Collection and Transport Cost Household/Year in Euro
43	Estimated increase in expenditures for investment in recycling, recovery and landfilling of collected quantities Household/Year in Euro
44	Estimated Total Cost of SWM (Collection, Transport, Treatment and Landfilling) with increase for investments Household/Year in Euro

2.2. CFM Indicators

Indicators	National currency/year	Euro/year

A. General Costs		
Total Costs of Operation per year		

B. Brake Down of Total Costs per Activity		
Sweeping		
Primary Collection		
Secondary Collection		
Selective Collection		
Treatment		
Disposal		

C. Cost/Activity/ton		
Sweeping		
Primary Collection		
Secondary Collection		
Selective Collection		
Treatment		
Disposal		

D. Cost/Activity/Capita		
Sweeping		
Primary Collection		
Secondary Collection		
Selective Collection		
Treatment		
Disposal		

3. Remarks and Recommendations for the upgrade and improvement of SWIS

Solid Waste Information System as a tool for assessing investment needs of PUCs and municipalities has been tested on several occasions since developed 4 years ago. It was tested within the GIZ IMPACT project, the "Solid Waste Data Collection in South East Europe" Project and through several independent activities run by Standing Conference of Town and Municipalities of Serbia and other

Associations of Municipalities within the region. This Report includes combined findings of Aquasan, SeSWA, NALAS and GIZ from the testing in over 30 municipalities/PUCs.

Insufficient or the lack of data regarding solid waste in one municipality but also some statistical data are proven to be the biggest obstacle in potential use of SWIS tool. The lack of specific data on indicators of solid waste management at local level, such as the number of households and other generators covered by organized waste collection, the total quantity of waste generated, the current quantity of collected waste, the quantity of recyclable fractions that are separated at source etc. are most common.

Within the project "Solid Waste Data Collection in South East Europe" basic activities were done on determination of the total waste quantity and the morphological composition of the generated waste. It is however prescribed within the legislation of Serbia as methodology and it should be recognized in the SWIS model.

SWIS tool is not data collecting system but rater suitable place (model) where data solid waste that are collected by PUCs (law obligation) are stored, combined in reasonable way and used for assessing present situation in waste management within the PUC and have solid ground for assessing possible investments.

Most of the findings are mainly technical. The most important challenges identified are:
- model should be empty when first used;
- translation of some cells in versions adapted to local languages are not correct or not translated at all;
- model should recognized both letters Cyrillic and Latin;
- pop-up warning on the beginning that model should be updated is not clear;
- cells that are not to be changed should all be locked as well as that conversion cells (m3 to T) should be locked;
- when clicked on the blue (locked) areas in the tables, the program automatically returns the user to the home page and similar.

However the findings regarding specific matter have most importance and will be closely elaborated to fulfill basic need for user friendly and understandable model. Most of the users had problem when filling worksheets 2 and 3, finding it complicated to use and lucking data for all entries.

Some findings on a specific matter observed by the users and stakeholders are listed below by worksheets:

Technical findings

0.1. Finding:	Model should be empty when first used
RE comment:	Agreed. Filled in model is confusing for the most of the users
Recommended action by RE:	For IT Expert empty the model of all the pre-entered data

0.2. Finding:	Translation of some cells in versions adapted to local languages are not correct or not translated at all
RE comment:	English variation must be considered as core one. RE expert works only on English version. It is recommended that after updating the model and all changes are

	applied in English version, to make copies of English version which will be than translated in other languages.
Recommended action by RE:	No immediate action needed.

0.3. Finding:	Model should recognized both letters Cyrillic and Latin
RE comment:	Agreed but this is the matter of translation. English variation must be considered as core one. RE expert works only on English version. It is recommended that after updating the model and all changes are applied in English version, to make copies of English version which will be than translated in other languages.
Recommended action by RE:	No immediate action needed.

0.4. Finding:	Pop-up warning on the beginning that model should be updated is not clear
RE comment:	Agreed.
Recommended action by RE:	For IT Expert unlink SWIS from non-existing file "SWIS test MODEL ES 16052011.xls"

0.5. Finding:	Cells that are not to be changed should all be locked as well as that conversion cells (m3 to T) should be locked
RE comment:	Agreed.
Recommended action by RE:	For IT Expert once model is updated with all the recommendations and ready for use lock all the cells except for those that are used for data entry.

0.6. Finding:	When clicked on the blue (locked) areas in the tables, the program automatically returns the user to the home page and similar.
RE comment:	Agreed.
Recommended action by RE:	This is purely technical issue and IT Expert should find solution and fix the problem.

0.7. Comment on draft report::	Revised SWIS tool should be based at least on Microsoft Excel 2010.
RE comment:	Agreed.
Recommended action by RE:	For IT Expert save the file in .xlsx format using compatibility with older version option.

Sheet 1 – Summery of Indicators

1.1. Finding:	Replace word "waste depositing" with "waste disposal" as it is most commonly used in English.
RE comment:	Agreed
Recommended action by RE:	For IT Expert, replace word "depositing" with word "disposal" eight times on Sheet 1 in following cells: B28, B29, B30, B32, B33, B34, B45 and B46

1.2. Finding:	Add one more indicator in "Municipal Waste Quantities" in SWIS Indicators as "Ratio between waste collected in Urban area and Rural area".
RE comment:	Valid suggestion. With the data entered SWIS could calculate ratio between average waste collection using the data on service coverage in urban and rural arias
Recommended action by RE:	For IT Expert, insert additional row in section "Municipal Waste Quantities" after item 16 new item 17. Ratio between waste collected in Urban area and Rural area. Formula in column C should be ='7. C&T COST COVERAGE'!H6/'7. C&T COST COVERAGE'!H7

Sheet 2 – Collected Waste

2.1. Finding:	Harmonize the table "the origin of waste by type" with current record keeping of the PUC – usually there is no data on the quantities of waste that are generated by companies and institutions, because waste collection systems by PUC are integrated for all service users. This is a case for most municipalities in Serbia. In addition, municipalities mostly have no data on industrial non-hazardous waste and agricultural organic waste - that is not within jurisdiction/competences of the PUC and there are no records.
RE comment:	This might be the case in Serbia but not necessarily in other countries of the region. On the other hand reporting requirements in the process of EU integrations will have to be adjusted to higher standards.
Recommended action by RE:	No immediate action required.

2.2. Finding:	It is needed to delete all generators that are not included in the collection system from the table. There is a possibility to add new ones if there are specific generators covered by the collection in the respective municipality. This is certainly not a long term solution, and it is necessary to organize separate collection of waste in relation to the origin, in accordance with organizational and financial capacity of municipalities and their PUC.
RE comment:	Similar to the previous comment SWIS is developed to serve broad specter of uses not limited to one municipality, one region, or one country and their specificities. It rather tends to cover and include all possible options that may arise in the SEE region.
Recommended action by RE:	For IT expert to add 3 rows for entering the type of generators and name them "Add additional type of generator if existing". Functionality/formulas should be as in already existing rows. Like in screenshot.
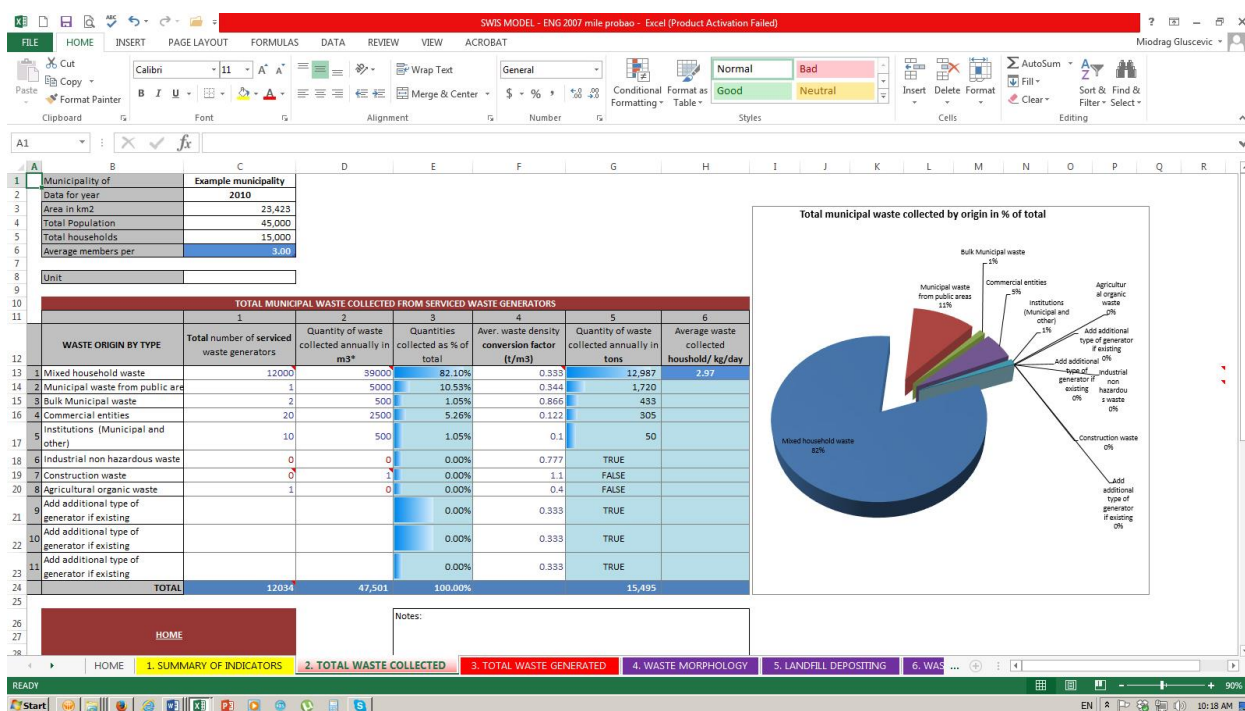
	2.3. Finding:	Worksheet 2 ("Total waste collected") gives the possibility to enter data in tons or in m^3. If data are entered in m3, an average waste density conversion factor (m^3/t) should be entered in column 4 in order to have amounts that are calculated in tons further in the model. For purposes of the Project it would be good to provide to pilot municipalities all missing average waste density conversion factors for types of waste they have, if it is possible
	RE comment:	SWIS is equipped with average conversion factors per type of waste generated.
	Recommended action by RE:	For IT expert to consider if excel allows protecting/unprotecting certain cell dependent on entry (tons or m^3 – optional choose from dropdown menu) in specific cell. Description of the action. Add cell asking the user if the entry will be done in m^3 or tons. Based on provided answer lock or unlock cells where quantities in one or the other unit should be entered.

	2.4. Finding:	Does the tool cover rural areas – whether and how the tool addresses the issue of waste generated in rural areas that do not end in the system (rural settlements can be covered by the service, but the question is whether all the waste ends up in containers);
	RE comment:	It does on spreadsheet 3 "Total Waste Generated"
	Recommended action by RE:	No immediate action required.

	2.5. Finding:	General problem for almost all municipalities was worksheet 2 – collected waste. They do not have data of the quantities of waste that are generated by companies and institutions and agricultural organic waste. Recommendation is to enable data entry for the total quantity of collected municipal waste, and additionally afterwards for its sub waste origins/generators, if such data exist. For calculation in column 7, instead average number of people per household, direct number of people covered by organized collection should be used. Useless waste generators should be deleted

	from the table. In worksheet 2, it is preferably to first enter data about quantity as values in tones, and then with conversion factors get relevant values in m³.
RE comment:	Indicator "AVERAGE household waste collected per capita/ kg/day" in column 7 is not relevant. Should be replaced with "Average waste generation per capita per day".
Recommended action by RE:	For IT expert: Column 7 on WS 2 should be deleted, Instead in WS 3 insert new indicator Average waste generation per capita per day placed as shown on screenshot. Formula should be (=L22/C4/365*1000) or "Estimated total waste generated in tons/year divided by Total divided by 365 times 1000".Population.
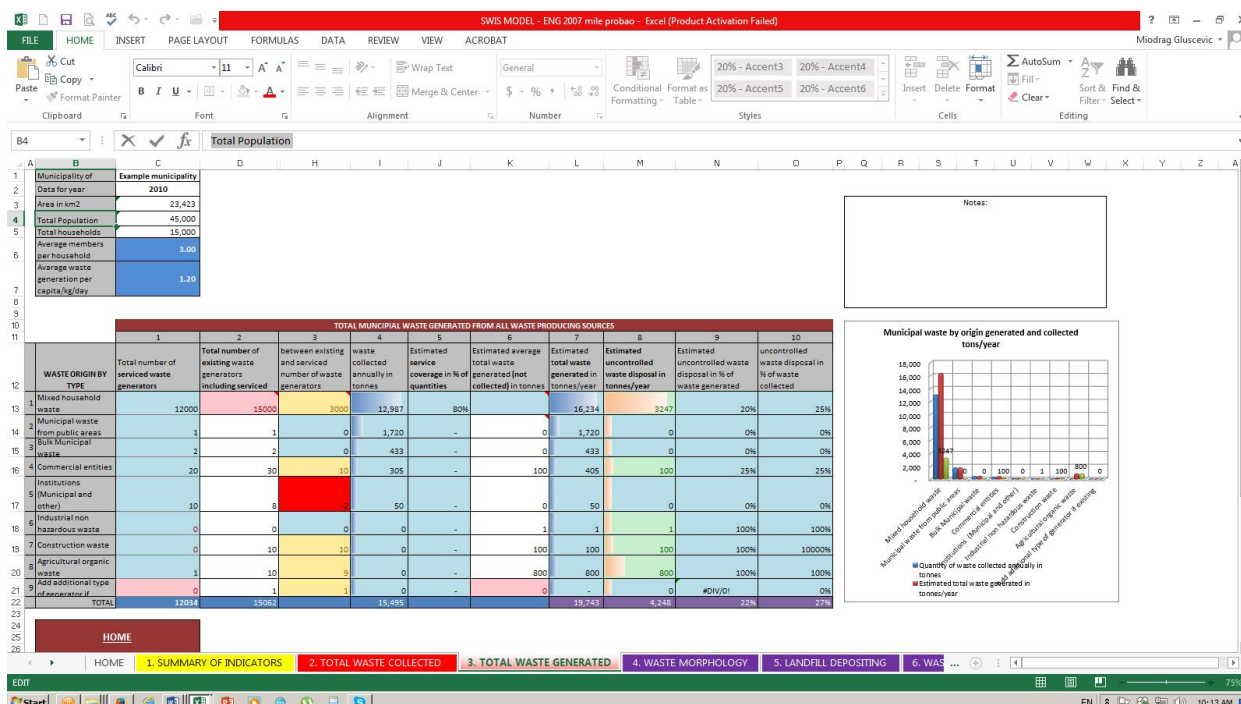
2.6. Comment on draft report:	- As for previous recommendations regarding the indicator „AVERAGE household waste collected per capita/ kg/day" in column 7 is concerned, we detected possible error in proposed formula (=L22/C4/365*1000) for new indicator which we find confusing. Cell L22 is placed on HOME option in ENGLISH version of tool. Our understanding is that the comment should be re-evaluated. - Our recommendation: Indicator „Average waste generation per generator per kg per day" should be introduced as new indicator and inserted as column 8 in cell J9 as an addition to current indicators in H9 and I9 cells. Formula should be (=G18/C18/365*1000).
RE comment:	Disagree
Recommended action by RE:	No additional action needed

Sheet 3 – Generated Waste

3.1. Finding:	There is an error in the formula for calculating the total number of the generators - when user enter the correct value in the cell, the system detected wrong value and changes color to red, which is not in accordance with the instruction manual. It is necessary to make a correction of formula, and users need to temporarily ignore the error, because it does not affect the further calculations.
RE comment:	Can't confirm this error. When checking English version model acted fine.
Recommended action by RE:	No action required

3.2. Finding:	Column 10 in worksheet 3 is unnecessary. Due to the large number of repeated data from worksheet 2, consideration of merging them into one worksheet is recommended.
RE comment:	Reasonable comments but would not recommend merging two sheets. In addition Cell O19 needs to be corrected by dividing with 100.
Recommended action by RE:	For IT Expert delete column 10 in worksheet 3. For IT expert in cell O19 correct formula by inserting divide by 100 to the formula. It should be as follows (=IF(I19=0,K19+I19,M19/(I19+K19))/100)

3.3. Finding:	Considering waste generators from worksheet 2, there are not enough data for waste quantities by waste generator.
RE comment:	Same as 2.1. and 2.2.
Recommended action by RE:	No need for immediate action.

3.4 Finding:	There is general remark that worksheet 3 is overburdened with unnecessary calculations (too many columns)
RE comment:	Column 10 could be deleted.
Recommended action by RE:	For IT delete column 10 in worksheet 3.

Sheet 4 – Waste Morphology

4.1. Finding:	Table of morphology of collected waste is not in line with the national methodology (stipulated by the legal framework). Temporary solution: manually adjust the table morphological composition of the waste in accordance with the instruction manual and the national methodology that combine metals into one category – aluminum cans and packaging, and other metal. Further, users have to merge three types of plastic waste into one category – high density plastic, packaging and plastic bags)

	which results in total of 12 fractions - out of 15 according to the classification and measurement model that is applied in practice. It is also possible to classify organic waste into one fraction (gather quantities of garden waste and other organic waste). On that way composition will be categorized in total of 11 waste categories. Having in mind that waste morphology is very important indicator for management system it is advisable to enlarge this table by developers to have 15 waste categories in total – remark by GIZ.
RE comment:	Refer to comment of finding 4.4.
Recommended action by RE:	Refer to finding recommendation of finding 4.4.

4.2. Finding:	As a long-term solution, the addition of special tables for all four seasonal analyses in accordance with the national methodology is proposed, so that the system automatically calculates the average values for the entire year. Additional, it has to be enlarged by tables for different municipal areas: urban zone – residential buildings, urban zone – individual households and rural zone – individual houses.
RE comment:	Possible and recommendable to include columns for seasonal measurement and to have year quantities calculated as average of seasonal measurements. Finding about entering quantities instead of percentage per waste is not recommended. To take into consideration inserting additional worksheet 4.a where would be possible to insert measurements per specific type of municipal area. Technically this easily done.
Recommended action by RE:	For IT expert insert four additional columns for seasonal measurements per morphology type. Input to be done in percentages. Yearly column should calculate average in percentages. In addition insert worksheet 4.a. for entering seasonal measurements per type of municipal area. Entry could be done in kg and then calculate percentages compared to mass of the sample. Visual look and formulas for Worksheet 4.a. will be provided to IT expert by RE expert.

4.3. Finding:	The morphology of waste is shown to include all categories of waste by origin - it is necessary to adjust the table so that the users have to insert values expressed in tones, and to system have to calculate the composition in percentage.
RE comment:	Refer to comment of finding 4.4.
Recommended action by RE:	Refer to finding recommendation of finding 4.4.

4.4. Finding:	We consider that a list of waste fractions in a worksheet 4 – Morphological composition is incomplete. To be in line with proposed methodology and composition analysis performed in selected municipalities as a part of project, we suggest the following list: Garden waste; Other biodegradable waste; Paper; Glass; Cardboard; Cardboard with wax; Cardboard with aluminum; Packaging and other metals; Aluminum

	cans; Plastic packaging waste; Plastic bags; Hard plastic; Textile; Leather; Diapers; Fine elements <20mm
RE comment:	This finding is very relevant and is in accordance with methodology for waste morphology determination developed for and used within SWDC SEE project. Therefore the waste morphology structure given by specific methodology should be integrated in SWIS so it could be able to correspond with data generated in pilot municipalities engaged in the project but also with data that will be produced in the future in the municipalities of the region. Methodology including 16 different types of waste is developed by Project Partner SeSWA and is elaborated in Appendix 1 and 1.a.
Recommended action by RE:	For IT Expert insert (replace) necessary rows and adjust morphology types to recommended 16 types. Fix the functionality (formulas per each waste type) as in original sheet.

4.5. Finding:	Beside average morphological composition of waste for whole municipality, worksheet 4 should also contain a column for the composition of waste from different sectors within municipality defined in methodology. Information about individual (rural and urban) and collective housing should be entered at the beginning of the worksheet 2, with other data about the municipality – remark by SeSWA.
RE comment:	See comment 4.2.
Recommended action by RE:	See recommendation 4.2.

4.6. Finding:	General remark by most of the participants at SWIS trainings are that Morphology of waste in worksheet 3 should be in line with excepted Methodology within the project "Solid Waste Data Collection in South East Europe" (SWIS has 11 categories, and methodology treats 16);
RE comment:	See comment 4.4.
Recommended action by RE:	See recommendation 4.4.

Sheet 5 – Waste Disposal

5.1. Finding:	The capacity of landfill space should be expressed in cubic meters rather than tones.
RE comment:	Acceptable remark since landfill capacity is usually given in cubic meters
Recommended action by RE:	For IT Expert insert additional cells/rows after row 24 and row 26 that would covert landfill capacity t into cubic meters. Use following titles and formulas: New row 25 - Cell C25 "Total projected landfill capacity in m^3", Cell D25=D24*0.9 New row 28 - Cell C28 "Capacity left in m^3", Cell D28=D27*0.9 Additionally add comment for Cells D25 and D28 "Average conversion factor for compacted mixed landfill waste is 0.7-0.9 t per 1 m^3"

5.2. Finding:	Data should not be entered into this worksheet if waste separation exists or if it is an option in planning. In accordance with it, values in columns 4, 6 and 8 should be 0% if there is separation. Filling in the worksheet in this way, the calculated value in column 10 will be 0% (which is a correct result), but the cell change its color to red – assuming mistake. In this case, SWIS should be changed in order to enable result 0% as the correct answer
RE comment:	Data in this Worksheet is entered if there is no separation
Recommended action by RE:	For IT Expert insert notification on the top of the Worksheet saying "Worksheet 5 is filled/used if there is no separation of waste in the municipality. Please refer to User Manual" Additionally for IT Expert to check if there is possibility in Excel to lock or unlock specific worksheet based on answer given to specific question. In this case insert cell next to the notification asking the user if there is separation in its municipality. If the answer is "yes" lock all the cells on the sheet for entering.

Sheet 6 – Recovery and Recycling

6.1. Finding:	As in waste morphology sheet, it is necessary to enter values in tones which are then calculated to percentages.
RE comment:	Entering quantities instead of percentage per waste is not recommended. Morphology for waste morphology is based on examination of samples and gives masse percentage per waste type therefore entering percentages is more favorable
Recommended action by RE:	No immediate action necessary

6.2. Finding:	Line 14 - the total amount of separated waste placed on the market implies a wrong value. It is necessary to correct the formula.
RE comment:	Can't confirm this finding. The formula is correct in English version.
Recommended action by RE:	No action needed.

6.3. Finding:	In column 12 (Total % of separated and deposited waste), the cell in row 7 turns to red with the value of 100% (which is a correct value) instead of becoming blue; the cell in row 9 in the same column is purple. This should be corrected.
RE comment:	Confirmed finding. Cell O7 is changing into red when total is 100% and it shouldn't. Also cell O9 is purple.
Recommended action by RE:	For IT Expert fix formatting Cell O7 – when showing 100% turn to blue. If value is different than 100% turn red. Fix formatting in Cell O9 should be blue when showing 100%.

6.4. Finding:	On the same worksheet one logical mistake has been noted: if a value in column 9 is 100%, the right part of the table (columns 13-19) should disable further data entering, because it was already said that a total amount of waste ends on the landfill and there are no other waste streams.
RE comment:	Confirmed, but logical thing to do is enter 0 values in columns 13-19. In that case model works fine.
Recommended action by RE:	For IT Expert if value in E column is 0 lock entry in columns Q, S and U in those rows and reseat value to 0.

6.5. Finding:	Cells in column D, rows 16 and 17, are linked to previous worksheet, but not protected and it is possible to change or delete the data unintentionally (reported in some language versions but not in all). Accidental alteration of entered data will automatically delete previous links. Note about charts within this worksheet: in the case of a small amount of waste separation in the municipality, names of waste fractions (which are automatically generated in the charts) are illegible, because titles overlap each other. This should be corrected.
RE comment:	This is because if worksheet 5 is filled than worksheet 6 isn't and other way around.
Recommended action by RE:	See recommendation 6.6.

6.6. Finding:	In worksheet 6 - Organized separation, the unit of measurement for columns 2 and 4 should be tons. Program would be supposed to account column 9. In worksheet 6, in columns 2, 4 and 9 required data are in a % of the total value or quantity. This was confusing for all municipalities. Despite our explanations that that is a total value of individual fractions, municipal representatives were thought that was about the total amount of waste. Since data from worksheet 5 are almost completely repeated in worksheet 6 (which is only extended with data regarding other waste treatment options), consideration of merging worksheets 5 and 6 into one worksheet is recommended. In that case, columns 9 and 10 need to be changed by columns 4, 5, 6 and 7 from worksheet 5.
RE comment:	Worksheet 5 is filled than worksheet 6 isn't and other way around
Recommended action by RE:	For IT expert – make note on the top of sheets: 1. sheet 5 – "If this worksheet is filled, that worksheet 6 must be empty – refer to User manual" 2. sheet 6 – "If this worksheet is filled, that worksheet 5 must be empty – refer to User manual" Additionally for IT Expert to check if there is possibility in Excel to lock or unlock specific worksheet based on answer given to specific question. In this case insert cell next to the notification asking the user if there is separation in its municipality. If the answer is "no" lock all the cells on the sheet for entering.

Sheet 7 – The Costs of Waste Collection and Transport

7.1. Finding:	Required increase of tariff for waste collection is not well done, so that cannot be achieved by increasing the cost of services by 100% of revenue. It is necessary to perform a detailed analysis of current practices and ways of cost accounting in the PUC's, as well as record revenues generated by charging utilities. Some PUC's do not have the possibility to make record of revenue for collection and transport of waste. For example, the company JKPD "Toplica" from Kursumlija has a unified system (one bill for all communal services). Only after such an analysis could be made relevant recommendations to systematize the information in the system.
RE comment:	This worksheet shows financial sustainability of the service and is indicative. More detailed analysis of incomes and expenditures and efficiency is necessary before tariff is changed.
Recommended action by RE:	For IT Expert insert notification on the top of the worksheet "This worksheet shows financial sustainability of the service and is indicative. More detailed analysis of incomes and expenditures and efficiency is necessary before tariff is changed"

7.2. Finding:	Part of a tool called "Calculation of costs for collection, transportation and recycling" is not sufficiently clear and it takes a lot of effort to sort the data in the fields provided;
RE comment:	This finding is too general. RE needs more clear explanation of the finding/problem in order to give recommendation for the improvement.
Recommended action by RE:	No immediate action needed.

7.3. Finding:	In worksheet 7 - collection and transportation costs, in segment tariffs, after the column H, should be another column in which should be written units and explanations for column H. Each municipality has a different system for cost calculation.
RE comment:	Agreed.
Recommended action by RE:	For IT Expert Insert column after column H which would allow entering the billing unit by the user.

7.4. Finding:	Data should be entered in the column H, in rows 3, 4, 6 and 7. Description from the header of the column explains that it is possible to enter data for number of inhabitants or number of households. However, model calculates number of households only. This should be corrected. This also raises the question why it is necessary to enter the number of households once again in the model, because it has already been entered.
RE comment:	Can't confirm this finding. Entry is being done for households in urban and rural areas. This information hasn't been entered before. Logical check could be provided linking the sum of urban and rural to total number of households in the municipality.

	For user it could be confusing to choose between households and population although this is used to calculate indicator of service coverage. Therefore it is recommended to stick with one of two.
Recommended action by RE:	For IT expert delete "inhabitants" from Cell G2 and "population from" Cell G5. Insert automatic logical control for cells H2 that checks if sum G3:G4 is identical to '2. TOTAL WASTE COLLECTED '!C5 and H5 where sum G6:G7 should be identical to '2. TOTAL WASTE COLLECTED '!C10

Sheet 8 – Financing the Investments

8.1. Finding:	Based on previous experiences, municipalities have big problems to find the information needed to enter the system. The data that is necessary to introduce in this section should be found in the medium-term and annual plans of utility companies, as well as other municipal planning documents (e.g. local waste management plans) that defines a framework for the improvement of infrastructure with elaborated costs necessary to purchase additional equipment for the collection, transport and treatment of waste.
RE comment:	This finding is too general.
Recommended action by RE:	No immediate action needed.

8.2. Finding:	In the part "Collection, transport, recycling and landfill costs correction" additional explanations or column headers are needed, because participants found that existing explanations are not explanatory enough.
RE comment:	This finding is too general. RE needs more clear explanation of the finding/problem in order to give recommendation for the improvement.
Recommended action by RE:	No immediate action needed.

8.3. Finding:	Furthermore, in the column C, row 6, the link leads to some completely different document: „='F:\DOCUME~1\Guest\LOCALS~1\Temp\[SWIS test MODEL ES 16052011.xls]7. C&T COST COVERAGE'!C14". (This could be seen when the worksheet is unprotected).
RE comment:	Finding couldn't be confirmed in English version.
Recommended action by RE	To avoid any mistakes in formulas, English variation must be considered as core one. RE expert works only on English version. It is recommended that after updating the model and all changes are applied in English version, to make copies of English version which will be than translated in other languages.

8.4. Finding:	It would be good to provide additional explanations for the entire worksheet
RE comment:	This finding is too general.
Recommended action by RE:	No immediate action needed.

8.5. Comment on draft report:	Some columns in Worksheet 8 entitled „Investment financing" are too narrow, as the 7-digits investments are not visible when entered in cells. We are mainly referring to column F but will recommend same operation for column H and J, as they are in protected mode and need to be expanded.
RE comment:	Acceptable finding.
Recommended action by RE:	For IT expert widen all columns that contain figures.

8.6. Comment on draft report:	Cells in Worksheet 8 related to depreciation cost for land should be locked, as the previous experience has shown that users enter the cost of depreciation for land by mistake.
RE comment:	Depreciation should be entered depending on specific situation.
Recommended action by RE:	No action needed.

8.7. Comment on draft report:	Insert additional cells in Worksheet 8 entitled „Investment financing" in order to achieve better functionality of the tool. We suggest that „Last date of data entry„ cell should be introduced in D2, so that the user/beneficiary can keep track of the last modified version of document.
RE comment:	Acceptable .recommendation
Recommended action by RE:	For IT expert in cell D2 insert text „Last date of data entry", cell E2 should be reserved for entry of the date.

8.8. Comment on draft report:	Cell entitled „name of the responsible person" with contact should be introduced in Worksheet 8, in B3 or D3. This refers to a person responsible for data collection in order to enforce a sense of responsibility in users.
RE comment:	Acceptable .recommendation
Recommended action by RE:	For IT expert in cell D3 insert text „Name of the responsible person", cell E3 should be reserved for entry of the name.

Sheet 9 – Narrative Part

9.1. Finding:	It is not possible to insert data since the cells are locked for changes. It is necessary to correct the system.
RE comment:	Finding couldn't be confirmed in English version.
Recommended action by RE:	Refer to recommendation 8.3.

4. Remarks and Recommendations for the upgrade and improvement of CFM

Cost and Finance Model was of a high interest by all participants on the training for partners of "Solid Waste Data Collection in South East Europe" project as well as for PUC and municipality representatives who have taken part.

PUC representatives have seen it as very useful since it is interactive, possible tool for foreseeing different scenarios and solid ground for monitoring the waste management system. However, following challenges were identified:

- It is recognized that some CFM users lack knowledge of "waste chains" from waste generators to final disposal is incomplete.
- At most municipalities, funds for waste management represents a combination of revenue from the municipality, foreign donations and others.
- Most of utility companies perform more activities than the collection and disposal of waste which is considered as an additional distracting factor for successful implementation of CFM. Often they do not keep records on finances for each activity separately.
- PUCs in their balance sheets, Financial plans and Reports and similar documents submitted to owners – municipalities, represent aggregated data, with almost no or very small breakdown, which makes very complicated to municipality representatives to fill in the CFM model.

Even though the model is quite demanding on data to be filled in, it is sill recommended to keep the existing structure as for this model should be used to determine costs in every step in waste chain and for users to understand it, as well as to educate managers of all costs altogether that are part of waste management system. If the data are not precise the model respects that some data could be as estimate and would still work.

All indicators produces in the model, as well as with recommendation of some to be added, are very good base for future step on benchmarking in waste management.

Most of the findings have technical nature related to:

- An issue with the server and inability to access and test the model properly. The model itself is web based and therefore some users where not that motivated to use it.
- Translation in different language versions is not properly done or is missing at some points.
- Problems with login, with date and telephone number cells, registration sheet being in English no matter what language has been chosen and that e-mail address should be stated instead of "User".
- Lack of possibility for interrelation between different lingual versions of the model.

For the purpose of model being more "user friendly" it has been recommended that it should be possible to be printed before filling in all data, as well as after completing. That would consider printing all parts of the model (all steps) and not just Indicators, as for most of the users are still "old school" and like to have hard copy of what they have done.

Since there was significant problem with login to the web based model, remarks from partners and stakeholders might not be complete. The most common findings with recommendations are listed as follows:

Finding 1:	No integration of CFM server and temporary server which doesn't allow users to access previously entered data
RE comment:	It has been confirmed that all data from temporary server are lost. All users will have to register again and enter the data.
Recommended action by RE:	Security of the data **must** be assured. NALAS Secretariat and IT expert shall provide sustainable and secured CFM data base.

Finding 2:	There is no integration and interrelation among databases in different languages which can result in variation of average values for separate language databases.
RE comment:	Integration and interrelation of data among all databases has to be obtained.
Recommended action by RE:	For IT expert to make possible integration and interrelation of all databases.

Finding 3:	The registration sheet is on English language despite the fact that the user selects local language as the working language.
RE comment:	The finding has been confirmed.
Recommended action by RE:	For IT expert to make language friendly login.

Finding 4:	During the log in process, it is not clear that "User" field requires entering the users registered e-mail address
RE comment:	Finding confirmed.
Recommended action by RE:	For IT expert to make changes to "User e-mail address"

Finding 5:	The data format for the "Date of entering the data" depends on the computer's settings (American settings require entering data in format mm/dd/yy).
RE comment:	Can't confirm this error. Could be dependable on personal setting of the computer.
Recommended action by RE:	For IT expert to give exact date format in the model

Finding 6:	Format of the telephone number should be given
RE comment:	Finding confirmed. It is not clear what format should be used and model keeps reporting error.
Recommended action by RE:	For IT expert to make visible telephone number format.

Finding 7:	User guide link on the bottom of the first page when choosing the year, is not working. Link in the line with all sheets is working
RE comment:	Finding confirmed.
Recommended action by RE:	For IT expert to fix the link

Finding 8:	CFM manual that can be downloaded from NALAS website doesn't match the on-line version of the model but it is intended for version in Excel. Two versions are same in terms of functionality but is completely different when it comes to visual appearance and use
RE comment:	Finding confirmed. The manual needs to be re-written and in consistence with on-line model. This is needed for all language variations.
Recommended action by RE:	After updating CFM model, RE will provide guidance for updating user manual upon all discoveries. Updating of manual will be in English as core version.

Finding 9:	No possibility to generate and print files with entered data and narrative report. i.e. it is recommended to have possibility to generate comprehensive report based on entered data (in electronic version and hard copy)
RE comment:	Finding confirmed. All users have reported need to have better visualization of entered data and wish to have data stored in offline option. (printed)
Recommended action by RE:	For IT expert to make changes: 1. with all commands "save" to have command "print" 2. on the bottom of each step should be command "print" as well 3. printing should be in PDF

Finding 10:	No possibility to print empty forms which would allow easier data collection from different sectors and departments in the PUC or local authority
RE comment:	Finding confirmed.
Recommended action by RE:	For IT expert, connected with previous table. Before saving, when model is empty, should be possible to have "print" command.

Finding 11:	It seems that issue of service contracting between PUC and LSG for cleaning of public spaces is not covered by the system
RE comment:	Regardless the option of contracting or subsidization by LG, PUC has same cost of activities. Difference is only in source of financing. This could be remark in the model but also could be added as separate source of income.
Recommended action by RE:	For IT expert to add new Source of revenue in Step 3 – General data input. After "Subsidization: national, regional, local government", add new row "Contracting with LG for WM at public areas"

Finding 12:	It is recommended to have subtotals for technical data
RE comment:	Not clear what is finding. RE could not find suitable place for subtotal that could make any use for the model missing
Recommended action by RE:	No action required.

Finding 13:	Inability to calculate indicators after entering all required data. The model returns empty indicators sheet and do not give any error message
RE comment:	Can't confirm finding. Could be some temporary problem with model. But there is a problem to "Save as PDF" for Indicators.
Recommended action by RE:	For IT expert to make link "Save as PDF" to work

Finding 14:	Step 6.: Average indicators for all CFM users does not have print option
RE comment:	This is RE finding and printing all parts of model, as well as this part, will make model more "user friendly" to all.
Recommended action by RE:	For IT expert to make "print as PDF" option

Finding 15:	Inability to change data once calculated indicators. The model does not accept data change and returns error
RE comment:	Could not confirm this. Could be that was problem with model when on temporary server or in some language variation.
Recommended action by RE:	After updating the CFM model, this needs to be re-evaluated to make sure that model works in all phases and provide option for data change and thus changing of the indicators.

Finding 16:	In case of error message, inability to understand where the mistake is made since pop-up error window does not provide explanation
RE comment:	RE has same opinion on this. Errors when leaving empty cell is marked red. But when error occurs in filling unsuitable data, the model does not recognize it.
Recommended action by RE:	The model does not have logical control. For IT expert to provide pop-up window with precise answer where mistake had been made.

Finding 17:	The format of benchmark report should enable side by side comparison of user's indicators with the average indicators of similar companies.
RE comment:	It is more visible to have personal and average indicators at same page (sheet)

Recommended action by RE:	For IT expert to make changes in Step 6 : Average indicators of all CFM users, where one column would be "your indicators"

Finding 18:	It is not clear whether "Budget for the services in last three years" field requires entering the average or the sum of budgets for the last three years
RE comment:	The Budget asked is for last three years as a sum of budgets
Recommended action by RE:	For IT expert to make visible that "SUM of budgets for the last three years" is required to fill in.

Finding 19:	Unit for the "Price of water" field is indicated as KM/m3 instead of NC/m3. (language model variation)
RE comment:	RE could not confirm. It is on one language variation and should be taken care of when finished upgrade of the model
Recommended action by RE:	All language variations must be checked for this mistake when finished.

Finding 20:	Data format for the question "Is the company paying VAT?" uses Cyrillic letters. (language model variation)
RE comment:	RE could not confirm in the English language version, but it is possible in different language variations.
Recommended action by RE:	All language variations must be checked for translation when finished. At this point RE is working only on English version as core one.

Finding 21:	There is no option for 1 working time.
RE comment:	RE could not confirm. It is unclear what the finding was.
Recommended action by RE:	Since no additional information have been provided by the author of the finding in order to be appropriately responded, there will be no action on this remark.

Finding 22:	Pop-up windows on inventory of vehicles have mistake: instead of "/vehicle" it should be written "Estimated number of kilometers".
RE comment:	This is not pop-up window but name of the column 13 in the part Vehicles. The word mileage is used instead of kilometers.
Recommended action by RE:	For IT expert to make changes – word "mileage" replace with word "kilometers"

Finding 23:	Is street sweeping necessary to be covered as separate part of the model? How is to calculate/determine quantities of waste collected from street sweeping?
RE comment:	Street sweeping is one of the activities in WM and therefore costs are related to it. This is a reason why it needs to be a part of the model. Determination of quantities of waste collected from street sweeping is upon estimate mainly.
Recommended action by RE:	No action needed. Quantity of waste collected from street sweeping is already calculated in total waste collected. The model does not calculate separately quantity of waste from street sweeping.

Finding 24:	In step 3 – General data input, in office overheads, cost should be divided in percentage to the activity. Model allows over 100 % for all.
RE comment:	The finding is true. Rises a question are office overheads self purpose existence or for the service of waste management. Other reason could be if PUC is giving other services than WM. In that case the model should calculate percentage.
Recommended action by RE:	For IT expert – in Step 3 – General data input, part – Operation cost information – Office Overheads – percentage of all in one row must be 100%. If not, pop-up window with warning should appear – "total of all percentage must be 100%"

Finding 25:	In the Step 4: Inventory, part Vehicles: for vehicles (truck and similar), part: Estimate % of use for SWEEPING; PRIMARY COLLECTION, SECONDARY COLLECTION, SEPARATE COLLECTION, the model allows more than 100 %.
RE comment:	Logical control must be applied at this and similar position in the model.
Recommended action by RE:	For IT expert to obtain logical control as follows – if percentage is over 100%, insert pop-up window with explanation "must not exceed 100%"

Finding 26:	Last column in Step 3: General data input – Source of information – it is unclear what the purpose is.
RE comment:	Model demands for this box to be filled. Since only the person who login the model can see this information, there is a question of necessity for that at all. Only reason could be to have it as remark for next person in same company who might fill the model in the future.
Recommended action by RE:	IT expert should leave obligation for the users to fill in this box in the model, but should add explanation in the same box - word "remarks", as for the next user of same company to understand where the data came from

Finding 27:	Step 1: Choose year - Model starts with current year. If user wants to have

	data for previous years have to go backwards. The model saves them by the entry, not by the years
RE comment:	RE expert is of an opinion that it would be much easier for the users to have cell with drop list of the years, i.e. starting with 2010. At that point user can choose year from the list. Also, already filled in years **must** be in row.
Recommended action by RE:	For IT expert to give open option of year to start with and when inserting additional year, to make it in line with others.

Finding 28:	Reset password does not work.
RE comment:	Confirmed by RE.
Recommended action by RE:	For IT expert to make changes.

Finding 29:	Some parts of the model in Inventory step, when filled and saved, close up by itself, but not all.
RE comment:	It is recommended to make it unified for all parts. The step 3 – General data input and Step 4 – Inventory are very long when all parts are open and therefore confusing for the users.
Recommended action by RE:	For IT expert to make changes – all parts of Step 3 and 4 – General data input and Inventory should close up automatically when saved.

Finding 30:	There is mistake in the model found. If the PUC is giving other services than WM, than there is cell to fill in percentage of overheads related to WM. The model does not recognize this percentage and calculates same indicators whatever percentage is.
RE comment:	Mistake found by RE. Needs to be recalculated in close cooperation with IT expert.
Recommended action by RE:	For IT expert to make adequate changes.

Finding 31:	The model does not recognize/accept editing even when saved, unless logout and login again.
RE comment:	Mistake found by RE. Needs to be changed in close cooperation with IT expert.
Recommended action by RE:	For IT expert to make adequate changes.

Finding 32:	Word "sweeping" is not correctly spelled in Indicators sheet.
RE comment:	Mistake found by RE. Needs to be changed in close cooperation with IT expert.
Recommended action by RE:	For IT expert to make adequate changes.

Finding 33:	It would be useful to have number of users in the Average indicators of all CFM users sheet.
RE comment:	Average is very important for the user to see where he belongs within the sector. However if average is from 2 users or 100 users, makes great difference, If user have number of all users of CFM who have filled in model, than he would have clearer picture.
Recommended action by RE:	For IT expert to add box on the top part of this sheet – "number of CFM users" And model should provide number of all users within the chosen range of inhabitants. This average must be of all users in all language variations.

Finding 34:	It is unclear how model calculates indicators. E.g. how does calculate street sweeping per capita comparing to total cost of street sweeping.
RE comment:	It would be useful if IT expert could provide formulas for indicators
Recommended action by RE:	IT expert to provide formulas for calculating Indicators.

Finding 35:	It is recommended to have another indicator: Total cost of all activities per tone without overheads and Total cost of all activities per tone with overheads.
RE comment:	Recommended by RE. Users like to have overall cost per tone as benchmark of their performance compared to other PUC.
Recommended action by RE:	For IT expert to add indicators: 1. Total cost of all activities per tone without overheads 2. Total cost of all activities per tone with overheads

Finding 36:	It has been reported by respective project partners and users that there have been many mistakes in translation
RE comment:	RE is working only on English version as core one. To make sure that all changes in model are secured and that all formulas work, all changes must be done in English version and translated after updating.
Recommended action by RE:	For NALAS and IT expert to consider English version as core one.

Finding 37:	In worksheet Input, question road infrastructure in the area (from lowest to highest 1-5 and narrative description), was confusing to users, it is necessary to put additional description or example of filling
RE comment:	Since it is narrative part and not number value asked it does not reflect to the indicators. However it is used for every user to have better insight of the conditions of work performed. It is most likely that users were confused by the purpose of this data. To make it clearer it will be described better.

Recommended action by RE:	For IT expert to add Step 3. General data input, Local area data, Road infrastructure in the service area (low to high 1-5 and narrative description of road conditions (local village roads; dirt roads; urban area roads with bad/good maintenance, etc.).

Finding 38:	In Input worksheet, information about the operating costs, instead of salaries would be better to stand gross salaries to avoid any confusion (net or gross salary).
RE comment:	In the web based model the terminology used is Average full salary cost per month. The word full stands for gross. To make it easier to understand it could be modified.
Recommended action by RE:	For IT expert to make changes: In General data input, Operational cost information; in all subparts where Average full salary cost is written, add gross. It should be written as follows: Average full/gross salary

Finding 39:	One of the problems was that some utility companies transport waste to landfills in other municipalities. There should be a space in the model for such scenario and a space for notes, because a lot of these specifics and deviations from the usual waste disposal routine.
RE comment:	There is place for explanation of Disposal model in the municipality, as well as it is asked who is owner of the landfill. This part together should be enough for the users. Even though they do not have all their own landfill they do have costs for disposal at some point and this should be represented in the model. The practice should be described and figures obtained where available.
Recommended action by RE:	No action needed.

Finding 40:	In a worksheet input in part sources of revenue/user payments, there are different rates for different categories of users (legal and physical entities, etc.). It is necessary to create categories of legal and physical entities and one "other."
RE comment:	In the web based model in the part Sources of revenue, several sources have been listed and there is place for "other" as many as user needs.
Recommended action by RE:	No action needed.

Finding 41:	We also believe that the model should be adapted to the system of collection which is currently present in all municipalities - a integrated collection of

	waste from households and by commercial entities and economic institutions
RE comment:	The model is based on integrated collection system. However due to many differences in the SEE region where model should be applied, the model itself has some additions for all users to find it suitable.
Recommended action by RE:	No action needed.

5. Closing remarks

Both models, tools, are found very useful by the stakeholders and therefore should be in better use. It is upon the model of communication and visual to obtain direct connection with possible users and to promote their purpose.

The CFM model, as online model, had difficulties in previous period due to problems with server and therefore was not properly tested by all project partners. It is recommended to have all partners to test the model in this period of upgrading to secure the best model as a result.

Respecting the fact that SWIS more static tool, it finds basic use as base for reporting within the PUC, but also to authorities. SWIS also envisage performance indicators for the PUC, giving decision makers solid ground in understanding the WM channels and future decisions. The tool itself has been improved upon finding from respected stakeholders and project partners in a way to be less burdened with some unnecessary data. However, some remarks on too many waste generators by origin and insufficient data for waste quantity by generator was not accepted due to basic purpose of the tool to be useful for all users, the advanced ones as well as to those on lower level of performance. The tool itself works well with smaller amount of data and should be encouraging to all users to improve their performance and work on expanding data available. The main changes have been made in waste morphology sheet respecting activities of "Solid waste data collection in SEE" project, keeping in mind 16 categories of waste to follow.

On the other hand, CFM tool is more dynamic one and gives possibility to make different scenarios of PUC performance in WM. It is advisable to have option of making different scenarios (2 or more) within one year for comparison. E.g. if PUC management consider renewal of equipment (vehicles) as buying new waste truck with all data for price and performance instead of old truck with all maintenance, spare parts and fuel consumption costs, who that investment would influence on PUC performance and indicators.

Apart of the different scenario tool of the model, there have been very little findings on specific matter, most likely due to problems with server and inability for model to be tested properly. It has been recommended in Draft version of this Report that all project partners make time to test model again, but very few did and therefore very few comments were received for CFM.

Since the model is web based, there are no directions how model works, as for how some indicator have been calculated. While testing again model by RE, it has been discovered that some changes of inserted data do not influence on indicator as it should be. This asks for closer cooperation between RE and IT expert to make sure that all indicators are properly calculated. The model itself is missing logical control on several positions which has been discovered by RE, especially in Inventory step and must be corrected.

Overall, both tools will be more use friendly and should be accepted by PUC and municipalities after applying all recommendations from this Report and upgrading by IT experts.

List of Appendixes

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Appendix 1.a   Methodology

Appendix 2.   Specific problems in implementation of SWIS model for each municipality – reported by SeSWA

Appendix 3.   Input from GIZ SMS Kosovo

Appendix 4.   Recommendations for SWIS improvement 24 09 2013 GIZ

Appendix 5.   Findings and recommendations for SWIS and CFM improvement prepared by Aquasan

Appendix 6.   Report SWIS and CFM – SeSWA

Appendix 7.   Report from the Meeting of the Platform - draft

Appendix 8.   Report for Advanced training on SWISS and CFM models for Aquasan staff in Bihac, BiH, 18-19 November 2014

Appendix 9.   Report SWIS and CFM

Appendix 10.   Report from SWIS&CFM basic training Sarajevo 27.11.2014

Appendix 11.   Modul 4 - Primenljivost alata i moguca unapredjenja - AQUASAN

Appendix 12.   Feedback on Draft Report_SeSWA

Appendix 13.   Feedback on Draft Report Recommendations on SWIS_Aquasan