D.C 7.1 WORKSHOPS FOR PUBLIC UTILITIES AND ENERGY AGENCIES

GERMANY

17/12/2018

1. Executive Summary

The main goal of this deliverable is to capture the most relevant information about the first set of trainings (D.C 7.1) carried out in all five of the pilot countries in 2018. This workshop was carried out with DT 2.2.1 in the same day. The document will be composed of an agenda and a description of the training's key parts; a participant list complemented by a group picture; and a list of the materials provided to the participants. The trainings have the main purpose to present and interactively test the Integrated Sustainability Assessment (ISA) tool that can be used to systematically assess technical innovations for energy optimisation of wastewater treatment plants (WWTPs) on different sustainability criteria. In this way it helps potential users such as utility operators or decision-makers in municipalities to determine whether and how the implementation of measures to increase energy efficiency and renewable energy production are useful. This is done by making predictions about potentials to improve energy efficiency, the technical feasibility or the environmental sustainability of the REEF2W solutions.

2. Agenda

Zeit	Beschreibung
10:00	Vortrag über das REEF 2W-Projekt
10:20	Kurze Präsentation über die Struktur des REEF 2W-Tools
10:50	Kaffee-Pause
11:00	REEF 2W Tool Vorstellung und Anwendung
11:30	Feedback, Diskussion
12:00	Gemeinsames Mittagessen

The training was comprised of four key parts. André Müller from adelphi moderated the training while the colleagues from Kompetenzzentrum Wasser Berlin gGmbH guided the participants through the tool. The first part of the training introduced the different participants and gave a short overview on the REEF2W project. Here, the

different pilot sites and the specific technological upgrades and their differences among one another were presented. Subsequently, the training directly proceeded to introduce the tool.

Figure 1: Christian Loderer from KWB introducing the project REEF2W

This was done through presenting snapshots of its key components, allowing the participants step by step to understand the methodology. Before the coffee break, general questions (e.g. first impressions on the REEF2W approach and the selected solutions) were asked. In the last and most important part values (obtained from a Berlin WWTP) were entered into the first version of the REEF2W decision support tool. It was decided spontaneously to have questions and remarks on the go, which proofed useful to receive concrete feedback.

3. Participant and speakers list

Figure 2: Participant list with signatures

Number	Name	Surname	Company	Country	e mail address	Signature
	First training course REEF 2W- Participant List- Berlin 22.10.2018					
1	André	Müller	adelphi	Germany		
2	Maike	März	adelphi	Germany		
3	Christian	Loderer	KWB	Germany		
4	Anne	Kleyböcker	KWB	Germany		
5	René	Griese	KWB	Germany		
6	Mehdi	Habibi	KWB	Germany		
7	Albert	Dietrich	Berliner Stadtwerke	Germany		
8	Christopher	Dreke	BWB (FE)	Germany		
9	Bernd	Heinzmann	BWB (FE)	Germany		
10	Marin	Garz	BWB (AE)	Germany		
11	Susi	Burczyk	BWB (AE)	Germany		
12	Andreas	Lengemann	BWB (AE)	Germany		
13	Magdalena	Gierke	BWB (AE)			
14	Nathan	Obermaier	UBA	Germany		
15	Jan	Wasdinewski	BWB (FE)	Germany		
16						

Mehdi Habibi, René Griese, Christian Loderer (Kompetenzzentrum Wasser Berlin gGmbH) and André Müller (adelphi) were facilitating the training. Participants in the training were seven in total while three participants are being introduced to tool and asked for feedback in separate meeting at the Waßmannsdorf WWTP.

Figure 3: Speakers list

First training course REEF 2W- Speaker List- Berlin 22.10.2018						
Number	Name	Surname	Company	Country	e mail address	Signature
1	Christian	Loderer	KWB	Germany		
2	Mehdi	Habibi	KWB	Germany		
3	René	Griese	KWB	Germany		
4	André	Müller	Adelphi	Germany		
5						

4. Training Materials

Table 1: Materials used at the Berlin training.

Type of material	Description
PowerPoint on REEF 2W project	Introduces the project, its objectives, potential benefits, and country partners as well as the different pilot sites and the specific fictive technological upgrades and their differences among one another were presented.
PowerPoint on ISA-tool	Introduces the tool by showing snapshots of its key components of the excel version, allowing the participants to understand the methodology step by step.
Prototype of ISA-tool (Excel)	Used to show structure and content of ISA-tool and to fill in values together with participants in order to gain feedback on strengths and weaknesses.
Long version of guideline for the ISA-tool (DT.5.1)	Presents the ISA-tool in detail as well as the technological upgrades being undertaken during REEF 2W and benefits expected to arise from their implementation.
Abstract of guideline for the ISA-tool (DT.5.1)	Produced by adelphi and Kompetenzzentrum Wasser Berlin specifically for the training (in English and German). It summarizes the long version, yet including more graphical elements.
Training Curricula (DT1.5.5) in German	Summarises the general approach taken in REEF 2W to conduct the trainings and provides information on potential participants, trainers, and the methodology.

5. Minutes and Feedback

Starting Section

- As a first step the status quo energy performance of the plant should be calculated (without heat pump, other add-on technologies)
- The introduction slide of tool should be a visual interface where you can click on different components of the the WWTP (such as biogas upgrading) and then insert values, for example for changing temperatures of the digester
- The visual appeal of the tool is critical so people use it while it will be more self-explanatory (nobody reads a manual!)
- After the status quo energy performance asssessment has been completed, there should be an interim result (status quo inputs: WWTP, substrates EE, digestion)+ the tool should make suggestions what the user can do now (e.g. if there is excess heat proceed to UCA; no excess = heat pump…)
- This guidance requires the user to only fill the needed information – and thus saves limited time.

Wording, readability and units of measurement

- Replace all complicated abbreviations with easy-to-understand words and add needed info in foot notes if necessary (e.g. OFMSW)
- Provide all units and – ideally – ranges for realistic values (beneficial if the user does not know everything in detail!) + mention it is ok that values can be outside of this range
- The tool needs to check typed in values and inform users if these are wrong/to cause errors
- WWTP input total energy, is this the total or net demand?
- Added value of clickable boxes (HTC, Composting) unclear
- Make numbers easier to read (=digit grouping)
- Input for anaerobic digestion: LHV should be written out/explained per "*"

Results Section

- total sum (of the monthly values) should be given
- the report/results definitely needs nice graphics!: indicators with red/green, nice graphs, break even points easily to see….
- Usability/Practicability

- We should reduce complexity on the tool's "surface" whereever possible (mayor of a small community or WWTP operator has no time)
- Also, keep in mind that they may not have comprehensive knowledge, especially in small plants (e.g. asked floor space of the buildings heated by the plant difficult)

EE

- Two questioned were raised: Is the DECAMAX topic considered? (->heating of sludge with excess heat for dewatering purposes); is the temperature from wastewater or digestion expected (@ input values) ?
- WWTP specific input: biogas fed into the grid: if a number in the status quo field is missing while future case has a number entered show error as result..

RES

- For photovoltaic the location is missing – the solar irradiance figure is different for each site;
- Wind power is missing as a renewable energy source;
- Heat pumps are an integral part of the calculation while they should be a an optional upgrade (we gave feedback on this topic to the tool developers); also there should be different options for a heat pump selectable: dimension, temperatures;
- There are (bio)gas powered heat pumps, maybe give that as an option if there is enough biogas to feed a CHP, but not enough for a second; (e.g. company ROBUR);
- Heat pumps may not deliver the required temperatures needed for injection into district heating (depending on the possible temperature, the user should be shown econmically viable options for <70°C (short distance heating) or >70° (distric heating);
- Add the amine scrubbing technology for biogas upgrading (it is relatively common in Germany);
- P2G option: should be selectable like other technologies;
- Where is the PV located… location not changeable
- @P2G: has no future scenario
- animal blood & wastes are a rather exotic substrate and rarely accepted by WWTPs due to hygienic concerns. Maybe hide these substrates in the "other" selection und put something more common in their place (e.g. olive oil residues…)

UCA

- monthly values should be used for the UCA tool because excess heat is only available during summer

- is the catchment area for co-substrates considered? As there is a feasible maximum of ~100km, it should be asked
- how is excess energy considered? ==>Yes, but at the moment there is no connection/ comparison
- if the explaining pictures are opened, there is no title which type of area this is (make it easy for the user; only one picture can be opened at the same time; let the user compare two pictures)
- maybe give some values for the amount of people living in this type of area (people/ha).
- What is external grid length? Is this the distance to the WWTP or short distance heating grid or something else?
- distance to gas grid injection(for biomethane injection) and operation pressure is not considered but vital
- UCA temperature of district heating grid ==>tool should say STOP and give alternatives if e.g. the heat pump can not deliver the required temperatures of the grid (e.g. >70°C)
- how much excess heat is available vs. how much heat demand exists=> how much of the demand can be accommodated?

Economic Tool:

- the input units are wrong, maybe cents are intended?
- subsidies are very different dependent on the type of renewable energy (PV vs. wind vs. CNG vs. biomethane….)!

LCA

- for chemicals you have to consider the real amount of active ingredient, an operator may only know the volume of a diluted chemical
- Add other chemicals? all: most users will not know such things, especially not the amounts of active ingredients….
- units should be changed into tons

6. Concluding remarks

- The 10 participants were active, raised many questions already during the trainings, and engaged in the discussion afterwards. **The resulting feedback includes various good points for improving the tool**;
- The training proved that the tool is **still at an early stage of development**, with much work to be done;
- Among technical issues, integrating **"live feedback"** on wrong values inserted and **connecting the five workings modules** seem most crucial;

- **Re-structuring the tool into two parts** – a) a status-quo energy performance and b) an evaluation of additional RE technologies – was highly recommended by the participants;
- The ISA generally **lacks visual appeal** while both the "starting interface" and the results section should be simplified/ complemented through graphical elements;
- Wherever possible**, reduce complexity on the surface level (what is visible to the user)** without undermining the science behind calculations.