

## BESSE newsletter 5

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June 2012

## Focus of this newsletter

### Background to the Lessons Learning Framework

The three BESSE research partners in conjunction with the demonstration partners (the water companies) undertook three case studies. The purpose was to do knowledge brokerage on specific issues identified by the water companies. The aim was to elicit lessons on the brokerage process.

### Lessons Identification

The case study framework, developed to extract the lesson learned, had three columns: the first related to the knowledge brokerage activity, the second to the significant changes occurring because of the brokerage and the third to the factors that assisted or hindered knowledge brokerage. An analysis of each activity was performed focusing on the resulting changes and factors that assisted or hindered the progress. From here, generic lessons, applicable to knowledge brokerage, were drawn.

### The Lessons

In the case of the BESSE research, many of the identified lessons already exist in the literature and for experts in sanitation may be common sense. However, the value in extracting the lessons from the pilot studies was to show their applicability in terms of knowledge brokerage in environmentally sustainable sanitation. Nevertheless, all the lessons are based on fresh knowledge generated through the research which defines a new understanding of knowledge brokerage in sanitation.

**This newsletter focuses on the lessons identified from the case studies.**



# Newsletter 5

Brokering Environmentally Sustainable Sanitation for Europe

## Lessons Learned from a successful sanitation knowledge brokerage project

Knowledge brokerage is the activity and the process to facilitate the transfer of knowledge and technology from one place or person to another, in order to help individuals and organisations to learn, to innovate and to improve.

The BESSE project's testing ground to experiment with knowledge brokerage was environmentally sustainable sanitation (ESS) and the driver for the research was to ascertain what the components are that will make wastewater treatment processes more sustainable.

The BESSE project is now in its final stages of winding down and we can now publish our findings. One component of our findings will be published as

different cities, with a broad scope of research foci, that ranged from mapping novel sanitation technologies to experimenting with knowledge brokerage. The results of all this work will be published as a resource on the BESSE website shortly:

[www.besse-project.info](http://www.besse-project.info)

Three wastewater treatment companies—in Bulgaria, Italy and The Netherlands—provided the empirical research sites for BESSE. These companies (and the public authorities that are responsible for their management) collaborated with research and public policy institutions to experiment with and reflect on innovative processes and the possible role of knowledge brokerage therein.



WBL Wastewater Treatment Plant in the Limburg Province, The Netherlands

a position paper, where we will take stock of European work done on sustainable sanitation and on experiences with knowledge brokerage. Another major component of our findings will be published as policy guidelines that will have as its focus directions on how knowledge brokerage can shape and influence innovation in the wastewater treatment processes to attain sustainability.

The BESSE project was carried out in a number of

An important part of the BESSE work was our own learning process to better understand knowledge brokerage, sustainability, and innovation in wastewater treatment processes — and do so in this hybrid combination of sanitation companies, research institutes, and public policy agencies. In that sense, BESSE has been one over-arching knowledge brokerage project from beginning to end.

## Summary of the Lessons Learned from the BESSE Project

Following is a summary of the lessons learned during the project about how knowledge brokerage works in general. The details of these lessons from a practical perspective follow on the next pages.

Three types of lessons were learned from the BESSE Project, namely lessons relating to the (i) understanding, (ii) setting up and (iii) application of knowledge brokerage in sanitation.

### Understanding Knowledge Brokerage

#### **Lesson Learned 1: Knowledge brokerage is a widespread social process**

BESSE has shown that knowledge brokerage is not only the domain of professionals. It is a widespread and continuous social process, normally carried out—often without realising it—by people other than professional knowledge brokers such as, for example, researchers, utilities managers and operators, civil society representatives, local authorities and technology suppliers. This means that to acknowledge and support the knowledge brokerage actors, and before activating knowledge brokerage actions, there has to be an understanding how knowledge circulates and who carries out knowledge broker functions.

#### **Lesson Learned 2: Knowledge brokerage by itself is not sufficient for innovation to take place**

The implementation of knowledge brokering actions is not enough to reverse the current trend of opposition to innovation in sanitation. As the project has shown, the factors underlying the lack of innovation in sanitation are deep and widespread. It would be illusory and unrealistic to imagine that innovation can be achieved only through knowledge brokerage. Knowledge brokerage alone cannot, for example, solve the financial problems of sanitation research, change the behaviour of actors who are, at present, uninterested in innovation, or arouse widespread mass social mobilisation over sanitation issues where there is none.

#### **Lesson Learned 3: Knowledge brokerage is necessary for innovation**

Knowledge brokerage is necessary for innovation. Without knowledge brokerage there is the risk that progress is not made. Knowledge brokerage can in fact produce a chain reaction in the change processes, forming a critical mass in demands for change amongst different actors. This function is critical when tendencies for change are weak, as in the case of sanitation.

### Setting up knowledge brokerage

#### **Lesson Learned 4: Systematicity**

A major lesson is that investing in knowledge brokerage cannot be done randomly, every now and again or only in one area without thinking of the other areas connected to it. Knowledge brokerage has a better chance of success if it is part of a systematic effort, which takes into account all aspects involved, which is continuous over time and which, as far as possible, follows a plan of action. For example, in Limburg, to activate reflection on sustainable sanitation a comprehensive series of interventions was implemented within the local utility, and then progressively extended to other stakeholders. In Pernik, different strategies were used for companies uninterested in connecting to sewage systems to get them to discuss the problem.

#### **Lesson Learned 5: Integration**

Another lesson that emerges from BESSE is that knowledge brokerage works best when sanitation stakeholders are part of an integrated process, creating interaction and fostering negotiation. All pilot projects addressed the need to create new communication channels between stakeholders that previously had hardly any relations, often due to the lack of trust. For example, in Pernik technicians in the local utilities were wary of sanitation researchers and experts, while in Castel Sant'Angelo there was a similar problem in the relations between the local government and utilities. In both cases, the knowledge brokers had to set up new channels of communication to overcome this situation of mistrust. A necessary step for initiating knowledge brokerage action was to find out who the stakeholders actually were, the relations between them, and the impediments to communication.

#### **Lesson Learned 6: Convergence of supply and demand**

Another aspect that emerged from the pilot projects is that those who seek new knowledge do not always know what knowledge they are actually looking for, while those offering new knowledge do not know exactly for what and whom it will be useful. In Pernik, for example, the pilot project, initially, was mostly used to help different actors to formalise the knowledge (technical and regulatory) needed by stakeholders (companies, local administrators, technical experts) to connect companies to the water treatment plants. Knowledge brokerage, in other words, works if it improves the quality of the demand for knowledge and the quality of the supply of knowledge; only then there can be convergence between demand and supply of knowledge.

#### **Lesson Learned 7: Adaptation of scale**

Another aspect that emerged from the pilot projects concerns the scale of knowledge brokerage interventions. There may be issues of knowledge brokerage on very different levels: within a single department, within an organisation, amongst different organisations, among whole sectors of society. However, the knowledge brokers observed that to resolve problems on one level, knowledge from other levels was needed too. In Pernik, for example, to address the problem of connecting businesses to wastewater treatment systems, the Ministry of Environment and Water had to be taken into account and it was necessary to cooperate with utilities in Sofia and Blagoevgrad to make actions in Pernik effective. In the case of Limburg, it was important to consult national as well as local experts, and refer to the experiences of innovation in sanitation conducted in other areas of the country to promote the development of a sustainable sanitation strategy by the local utility.

#### **Lesson Learned 8: Reflexivity**

An important theme that emerged from BESSE is that knowledge brokerage works well if it can improve reflexive capacity in sanitation actors, for instance a more open attitude towards the discussion of problems and an awareness of the importance of knowledge to solve them. In Castel Sant'Angelo, for example, only after several meetings and knowledge brokerage initiatives did the local government begin to seriously consider the problem of monitoring treatment plants. In the case of the Limburg pilot project, different activities were needed that aimed specifically at starting serious discussions within the utility on the sustainability of their sanitation procedures.

#### **Lesson Learned 9: Plurality of knowledge**

One lesson that emerges from the whole BESSE project is that any sanitation intervention requires different fields of knowledge and not only



## Summary of the Lessons Learned from the BESSE Project ... cont.

knowledge of scientific or technological nature. In the case of Pernik, for example, in addition to technological knowledge, it was necessary to provide knowledge on national rules about the disposal of industrial waste, on the local environmental situation, on companies' concerns about being connected to the treatment systems and on successful experiences elsewhere. In fact, what became clear is that scientific and technological knowledge is becoming increasingly dependent on other types of knowledge (procedural, organisational, social, regulatory, etc.), without which the scientific knowledge is more or less useless. This means at least that different disciplines need to be involved, such as engineering, medicine, chemistry, biology, law, economics and social sciences.

### Applying Knowledge Brokerage

#### Lesson Learned 10: Brokerage case studies

During BESSE case studies were successfully tested (Limburg) to identify and capitalise on previous knowledge brokerage experiences in similar contexts. In these cases it was useful to identify the obstacles and enablers encountered by brokerage in previous experiences, so as to anticipate any problems in the new situation.

#### Lesson Learned 11: Brokerage survey

A useful tool to facilitate knowledge brokerage is to explore — through a series of preliminary meetings — the views of different stakeholders (Castel Sant'Angelo, Pernik): whether they have positive or negative attitudes, what expectations they have, whether they use a collaborative or solitary approach, etc. In this way, it becomes easier to understand, for example, which tools seem most fitting to overcome opposition or what problems may arise when knowledge brokerage is started. Thus one may find out about the key players within the different organisations involved, especially those that can influence decision-making processes.

#### Lesson Learned 12: Preliminary analysis of knowledge needs

During BESSE the risk was noted that knowledge fails to satisfy the needs of different stakeholders. More effective action can be achieved by conducting a preliminary analysis of the cognitive needs of all stakeholders (Limburg) by using different instruments (meetings, production and discussion of documents, in-depth interviews), so that knowledge needs may be determined in advance as accurately as possible.

#### Lesson Learned 13: Participatory approach

One lesson learned from the pilot projects, is that knowledge brokerage cannot be accomplished top down. The simple dissemination of knowledge does not work. A participatory approach is needed — one that facilitates the personal and emotional involvement of everyone. Knowledge brokerage planning, too, is much more effective if implemented in a participatory manner (Limburg). By planning, designing and acquiring new knowledge together, it is easier for stakeholders to establish ownership of the initiative, and to get involved in reducing opposition and obstacles. Moreover, participatory planning makes it easier to grasp the long-term impacts of brokerage, including those not initially foreseen and which often form the basis of strong opposition to innovation (for instance, the risk that the introduction of new technology produces a loss of jobs or a reorganisation of sanitation services that penalizes some sectors to the advantage of others).

#### Lesson Learned 14: Iterative interaction

The pilot projects showed that it is impossible to transfer complex knowledge through single, individual meetings or initiatives. Knowledge brokerage can be promoted more effectively by planning iterative interaction at an early stage (for instance, a series of meetings or tutorials) to give everyone time to get to grips with the problems, develop their own points of view, and absorb new knowledge.

#### Lesson Learned 15: Plurality of perspectives

Experimentation has shown that brokerage can be improved by looking at problems and knowledge from different angles and perspectives (for example, those of management, technical staff, researchers, users, etc.) (Castel Sant'Angelo). This gives target groups an overview of the issues and a better understanding of what is at stake.

#### Lesson Learned 16: Flexibility

In actions to promote brokerage different stakeholders may be more sensitive and respond better to some tools rather than others. Adopting a flexible approach that proceeds by trial and error seems to be the most effective method when the situation is one of opposition and conflicting interests such as that of brokering knowledge in sanitation. For this reason, it is best to make use of the many tools of knowledge brokerage (meetings, interviews, research activities, field trips, production and dissemination of documents, conferences, brainstorming sessions, etc.), choosing the ones that appear to be most suitable for the occasion.

#### Lesson Learned 17: Transparency

While carrying out different knowledge brokerage activities, it was seen that trust among stakeholders was a strong enabler. The approaches based on transparency and full information sharing among stakeholders were found to be the most effective tools for building cohesion around technology transfer.

#### Lesson Learned 18: Visibility of the benefits of new knowledge

Another element that proved decisive for the successful transfer of knowledge was to give as much visibility as possible to the benefits of acquiring new knowledge by means of brokerage. One of the most effective instruments was the organization of demonstrations to give a concrete form to the benefits of the new knowledge to be introduced. This effect can also be obtained through direct knowledge of experiences where new knowledge has been already introduced.

#### Lesson Learned 19: Exploiting the local dimension

In promoting knowledge brokerage, we have seen how important it is to capitalise on the local dimension (Castel Sant'Angelo). This applies, above all, to locally acquired knowledge (for example, in utilities, in local universities, by local government technicians, etc.). To this end, it may be particularly important to involve local sanitation experts, who are well acquainted with the problems of the area and who are already in contact with stakeholders interested in brokerage. Another issue is to use the same language, for example, in defining problems or in proposing possible solutions.

#### Lesson Learned 20: Monitoring

A powerful tool to promote knowledge brokerage is to involve stakeholders in periodic monitoring activities (Pernik). This highlights the actions already carried out and what remains to be done; secondly, it means that problems, opposition, conflicts or differences of opinion can be spotted and dealt with at an early stage.

## The three domains of knowledge brokerage

### Relationship to Theory

The BESSE project worked on identifying the hindering and facilitating factors to the transfer and dissemination of knowledge in environmentally sustainable sanitation. This work identified three knowledge brokerage domains being

- Knowledge identification
- Interaction and
- Application

#### Knowledge Identification Domain

In this domain, knowledge brokerage considered the available knowledge and identified (selected and organised) those items potentially exploitable in terms of applications and technologies within a given sector (in this case, that of sanitation).

#### Interaction Domain

In this domain, knowledge brokerage is aimed at creating a relatively stable, meaningful and effective interaction among players who play or should play a role in exploiting new knowledge.

#### Application Domain

In this domain, knowledge brokerage is strategically aimed at 'implementing' the new knowledge, that is, contributing to transforming it into concrete innovation of any nature (definition of new norms, activation of new research projects, application of new knowledge and technologies, etc.).

#### Knowledge Identification Lessons

Below are the lessons identified above presented according to this categorisation.

**Lesson:** Carry out an audit at the outset to understand all issues concerned. The audit should include all stakeholders and aim to gain an understanding of their perspective on the issue.

**Lesson:** Try to identify where brokerage has worked successfully in a similar environment. If possible, do a study of that brokerage to understand the key success factors.

**Lesson:** Try to identify where brokerage has not worked successfully in a similar environment. If possible, do a study of that brokerage to identify and understand what the key obstacles to brokerage were in that case.

#### Interaction Lessons

**Lesson:** Organisations and people can perceive new ideas and concepts as complex and/or irrelevant. Sometimes they need external facilitation to cross this barrier.

**Lesson:** When brokering knowledge, one should be aware that re-

sistance could arise from a lack of understanding of the concept (in this case environmental sustainability), especially if the organisation perceives the *status quo* as working.

**Lesson:** Brokerage requires wide-ranging acceptance of the innovation. A communication plan is therefore important.

**Lesson:** One should target all stakeholder groups within the organisation for dissemination.

**Lesson:** Where expertise is available in-house, use this expertise to mediate the knowledge brokerage.

**Lesson:** Where possible, broker the innovation in a language the audience speaks fluently.

**Lesson:** High-level engagement is important whatever the context. Management buy-in is crucial.

**Lesson:** The knowledge brokerage should make clear the benefit that will accrue to the organisation in adopting the innovation. The key here is detail. Ideally, you should define the benefit in terms of the organisation's goals and processes.

**Lesson:** Knowledge brokers should check that the organisation understands the benefit they will derive from the innovation. Do not assume that your explanation of this suffices. You may need several iterations of explanation before the projected benefit is internalised and becomes clear.

**Lesson:** It is vital that knowledge brokers are familiar with the context within which they will be doing brokerage. This enables them to couch their brokerage in terms that the organisation is familiar with.

**Lesson:** Involve local expertise in the brokerage wherever possible. People respond better to the familiar.

**Lesson:** Staff need to perceive that management is driving the process. Management can facilitate this by issuing regular updates to keep staff abreast of developments.

**Lesson:** Related to the above, knowledge brokers need to be aware of weak management commitment. Management can say and do all the right things without being fully committed. Staff notices weak commitment quickly.

**Lesson:** Aim to demonstrate the tangible benefits early on in the knowledge brokerage process. This stimulates further buy-in and commitment to the innovation.

**Lesson:** One-off initiatives to untangle complex ideas such as sustainability are rarely successful. Plan to have several iterations. If possible, use a different approach and perspective for each session. This helps people get a more rounded picture of the idea than does using a single approach.

**Lesson:** Involving the 'brokered-to' organisation in developing the innovation improves the chances of uptake.

**Lesson:** Knowledge brokerage can flounder if the parties to the brokerage process are averse to knowledge sharing.

**Lesson:** The consequences of adopting an innovation will differ between organisations. Knowledge brokers need to understand the risk threshold of those receiving the brokerage. Sanitation companies have a high risk-threshold because of the public health consequences of sanitation.

**Lesson:** Innovation by itself is not intrinsically good. Brokers need to identify a hook to promote the innovation where its utility is not immediately apparent or only speaks to a niche concern.

## The three domains of knowledge brokerage ... cont.

**Lesson:** Sustained engagement improves the chances of both parties (the brokers and the recipients of brokerage) building a working relationship. A strong working relationship in turn further facilitates brokerage.

**Lesson:** It is easier to do brokerage within a small organisation. If doing brokerage in a large organisation, it may pay to target sub-groups within the organisation initially.

**Lesson:** Once the organisation receiving the brokerage accepts the need for innovation, it can quickly move ahead of the brokers in its innovative thinking. Brokers should guard against this.

**Lesson:** Guard against passive audiences. Dissemination gets messages across sometimes but not always. For example, the target audience may not read the report they have received. Brokerage needs to combine a mix of passive and more active communication channels.

**Lesson:** Introduce new ideas to people incrementally. Detail is important but should only come later once people have an overview and understood the high-level implications of the innovation.

**Lesson:** Adopt a brokerage strategy that incorporates elements of co-development. This promotes ownership

**Lesson:** It is helpful to obtain as many perspectives on the brokerage issue from staff of the organisation. This should enable understanding of what works within that context.

**Lesson:** Aim to identify the organisation's important stakeholders, particularly those who could influence decision-making within the organisation. Design brokerage mechanisms that take into account this group.

**Lesson:** Communication is vital to unlock a deadlock. Brokers should prioritise establishing dialogue where this is lacking. Once dialogue is established, it may reveal that the perceived differences were not as

great as thought and pave way for a resolution of the problem.

**Lesson:** Check that all parties understand the reasons for the brokerage. Active communication methods achieve this more effectively than passive methods. Active (face to face) methods allow one to make clarifications and permit the broker to check understanding.

**Lesson:** Provide stakeholders with as much relevant information and knowledge relating to the innovation. Full disclosure to everyone involved assists with cohesion building and establishing trust.

**Lesson:** Introducing innovation could lead to unintended consequences. An example would be the loss of jobs in the organisation resulting from the innovation. Brokers should anticipate and plan for how to manage such consequences, which could be a powerful source of resistance.

### Application Lessons

**Lesson:** Few innovations become keystone issues for the organisation – that is, become the issue upon which all else in the organisation depends. Therefore, while doing brokerage, it is crucial to bear in mind that your brokerage activity will be competing with other issues for the attention of people in the organisation

**Lesson:** Brokerage mechanisms should include monitoring strategies that incorporate reflexive methods for both brokers and the organisation receiving the brokerage.

**Lesson:** Use several brokerage methods and mechanisms to enhance the chance for a quick progress. People respond well to a range of stimuli.

**Lesson:** Be flexible in your approach. Not all brokerage mechanisms will be appropriate. If one approach fails, substitute it with another.



The BESSE Project Team in Rome, Italy in 2012



## Specifics about the Lessons Learned

### Cast Study: Waterschapsbedrijf Limburg, The Netherlands

#### Conceptualisation of a sustainable wastewater treatment plant

The first conclusion in this case study was that the Waterschapsbedrijf Limburg (WBL) required external facilitation to make progress on its sustainability agenda and the water board required assistance to negotiate the complexity of the concept sustainability so that the WBL could move forward with a clear agenda about what a sustainable sanitation wastewater treatment plant should be. The WBL was then able to define its criteria for sustainability. The process was assisted by the knowledge that a sister water board was already considering similar issues.

**Lesson:** Organisations and people can perceive new ideas and concepts as complex and/or irrelevant. Sometimes they need external facilitation to overcome this barrier.

**Lesson:** When brokering agreement, one should be aware that resistance could arise from a lack of understanding of the concept (in this case environmental sustainability), especially if the organisation perceives the *status quo* as working sufficiently.

#### Internal Dissemination of the BESSE Project within WBL

There was a core group of early 'adopters' within WBL. This group was aware that all or most of what WBL would need for the project to succeed. Identifying key staff within WBL to drive the project represented a milestone and signalled progress. Disseminating information about the sustainability agenda throughout the organisation raised awareness, strengthening buy-in from the WBL staff. The staff themselves undertook the dissemination activity and this helped the process (trust among peers), and enabled better communication.

**Lesson:** Knowledge brokerage requires wide acceptance of innovation, which places high importance on a communication plan.

**Lesson:** One should target all stakeholder groups within the organisation for information dissemination.

**Lesson:** Where expertise is available in-house, use this expertise to mediate the knowledge brokerage process.

**Lesson:** As much as possible, broker the innovation in a language the audience understands and speaks fluently.

#### Engagement of the Management Team

The BESSE partners from the University of Maastricht made a presentation to the WBL management team which included information about the project and also of the MARBLE project. A facilitating factor was that the students' research goals aligned well with the goals of WBL. However, it was difficult to establish exactly what the MARBLE students could offer in concrete terms.

**Lesson:** High-level engagement is important whatever the context. Management buy-in is crucial.

**Lesson:** The knowledge brokerage process should make the benefit that will accrue to the organisation in adopting the innovation very clear to all stakeholders and the key component here is detail. Ideally, one should define the benefit in terms of the WBL's goals and processes.

**Lesson:** Knowledge brokers should check that stakeholders in the organisation understand the benefit they will derive from the innovative direction that it is expected to take. It is important to keep in mind that one should not assume that one's explanation of this suffices. One may need several iterations of explanation before the benefit is internalised and becomes clear.

#### Conversation with Dutch Sanitation Experts

The BESSE team held consultations with Dutch sanitation experts to better understand the local and national contexts. The result of these conversations was that the partners from the University of Maastricht had ready examples in Cannibal, Nerada and Demon to use in their knowledge brokerage activities. Furthermore, the knowledge of the involvement of Dutch sanitation experts reassured the WBL.

**Lesson:** It is vital that brokers are familiar with the context within which they will be doing knowledge brokerage. This enables them to couch their brokerage in terms that the organisation is familiar with.



Peter Wijnands | Photography

Wastewater Treatment Plant, The Netherlands

## Specifics about the Lessons Learned ... cont.

**Lesson:** Local expertise should be involved in the knowledge brokerage process wherever possible as people respond better to the familiar.

### Internal Memorandum

The WBL management issued an internal memorandum to explain the 'green' concept to all staff members and to elaborate on what it would mean for WBL. This facilitated cooperation and buy-in amongst staff.

**Lesson:** It is important that staff believe in this management-driven process. Management can facilitate this by issuing regular updates to keep staff abreast of developments.

**Lesson:** Related to the above, knowledge brokers need to be aware of weak management commitment. Management can say and do all the right things without being fully committed. Staff notices weak commitment quickly.

### Meeting: University Maastricht, WBL and Marble Students

This meeting provided a platform for stakeholder engagement. At the meeting, a Plan of Action for the next set of activities was set and WBL suggested a trip to a wastewater treatment plant for the students to learn more about the treatment process. While this meeting facilitated trust building, some WBL staff were a bit uneasy at the prospect of supervising student projects.

**Lesson:** Seek platforms for engagement. Meetings are a good platform. They need to be frequent at least initially to facilitate bonding and trust building.

**Lesson:** Be aware of people's comfort zones. Even highly qualified people will balk at taking on roles that they are unfamiliar with.

### Research Conducted by Marble Students on Individual Themes

This research demonstrated clear benefits to WBL as the students' research aligned with WBL needs.

**Lesson:** Aim to demonstrate tangible benefits early on in the knowledge brokerage process as this stimulates further buy-in and commitment to the innovation.

**Lesson:** Once-off initiatives to untangle complex ideas such as sustainability are rarely successful. Plan to have several iterations and if possible, use a different approach and perspective for each session. This helps people get a more rounded picture of the idea than does using a single approach.

**Lesson:** Few innovations become keystone issues for the organisation – that is, become the issue upon which all else in the organisation depends. Therefore, while undertaking knowledge brokerage, it is crucial to bear in mind that your brokerage activity will be competing with other issues for the attention of people in the organisation.

### Study of the Implementation of Cannibal

BESSE undertook a study of the implementation of the Cannibal, Nereda and Demon projects with the help of the water board where Cannibal was implemented by Siemens as the vendor. This furthered BESSE's un-

derstanding of the knowledge brokerage process in a similar environment.

**Lesson:** Try to identify where knowledge brokerage **has worked** successfully in a similar environment. If possible, do a study of that brokerage process to understand the key success factors.

**Lesson:** Try to identify where brokerage **has not worked** successfully in a similar environment. If possible, do a study of that brokerage to identify and understand what the key obstacles to knowledge brokerage were in that case.

**Lesson:** Knowledge brokerage can flounder if the parties to the brokerage are averse to knowledge sharing.

**Lesson:** The consequences of adopting an innovation will differ between organisations. Knowledge brokers need to understand the risk threshold of those receiving the brokerage. Sanitation companies have a high risk-threshold because of the public health consequences.

**Lesson:** Innovation by itself is not intrinsically good. Knowledge brokers need to identify a hook to promote the innovation where its utility is not immediately apparent or only speaks to a niche concern.

### Invitation of the BESSE Pilot Project

Discussion between BESSE and the WBL team continued to further fine-tune the concept of sustainability as it applies to WBL. This led to a broadening of the scope of sustainability within WBL from the desire to build a sustainable modular treatment plant to sustainability becoming more about the 'greening' of WBL.



Wastewater Treatment Plant, The Netherlands



## Specifics about the Lessons Learned ... cont.

**Lesson:** Sustained engagement improves the chances of both parties (the knowledge brokers and the recipients of brokerage) building a working relationship. A strong working relationship in turn further facilitates brokerage.

### Green Thinking Workshop

This workshop was a continuation of the dialogue between WBL and BESSE relating to the idea of greening WBL.

**Lesson:** It is easier to do knowledge brokerage within a small organisation. If doing knowledge brokerage in a large organisation, it may pay to initially target sub-groups within the organisation.

**Lesson:** once the organisation receiving the knowledge brokerage accepts the need for innovation, it can quickly move ahead of the brokers in its innovative thinking. Knowledge brokers should guard against this.

### Workshop Report Distributed Amongst WBL Employees

This was a dissemination exercise designed to further communicate progress on the project and facilitate buy-in by staff.

**Lesson:** Guard against passive audiences. While information dissemination gets messages across, it is not always the case. For example, the target audience may not read the report they received. Knowledge brokerage thus needs to combine a mix of passive and active communication channels.

### Second Part of the Pilot Project

This was to consolidate and agree on scope of green thinking as it relates to WBL and it involved investigating how WBL does sustainability knowledge brokerage. This information would then inform the development of a WBL strategy map.

**Lesson:** Introduce new ideas to people incrementally. Detail is important but should only come later once people have an overview and understood the high-level implications of the innovation.

**Lesson:** Adopt a knowledge brokerage strategy that incorporates elements of co-development. This promotes ownership and commitment.

### Individual Interviews with WBL Employees

This was to enable the BESSE team to get a good understanding of the project environment. It also enabled the team to get an insight into how sustainability was understood within WBL and identify existing knowledge brokerage mechanisms.

**Lesson:** It is helpful to obtain as many perspectives on the brokerage issue from staff of the organisation. This should enable understanding of what works within that context.

**Lesson:** Aim to identify the organisation's important stakeholders, particularly those who can influence decision-making. Design the knowledge brokerage mechanisms to consider this group.



*WBL Wastewater Treatment Plant in Limburg, The Netherlands*

### Final Presentations of marble Students

These presentations provided feedback to WBL on how it is progressing and provided an opportunity for self-assessment.

**Lesson:** Knowledge brokerage mechanisms should include monitoring strategies that incorporate reflexive methods for both brokers and the organisation receiving the brokerage.

**Lesson:** Use several knowledge brokerage methods and mechanisms to enhance the chance for quick progress. People respond well to a range of stimuli.

**Lesson:** Have a flexible approach. Not all KB mechanisms will be appropriate. If one approach fails, substitute it with another.

## Specifics about the Lessons Learned ... cont.

### Cast Study: Pernik, Bulgaria



#### Problem Mapping

The project set out to understand the main problems regarding sustainable sanitation in Pernik.

#### Communication

The BESSE project identified lack of communication between the local authority and the scientists working on the sewerage system as a crucial problem.

**Lesson:** Communication is vital to unlock a deadlock. Knowledge brokers should prioritise establishing dialogue where this is lacking. Once dialogue is established, it may reveal that the perceived differences were not as great as thought and pave way for a resolution of the problem.

**Lesson:** Check that all parties understand the reasons for the knowledge brokerage process. Active communication methods achieve this more effectively than passive methods. Active methods allow one to make clarifications and permit the broker to check understanding.

#### Introducing Innovation

**Lesson:** Introducing innovation could lead to unintended consequences. An example would be the loss of jobs in the organisation resulting from the innovation. Knowledge brokers should anticipate and plan for how to manage such consequences, which could be a powerful source of resistance.



Wastewater Treatment Plant in Pernik, Bulgaria

### Cast Study: Castel Sant' Angelo di Rieti, Italy



#### Communication

The BESSE project identified the lack of communication between the local authority and the scientists working on the sewerage system as a crucial problem. The project worked to establish dialogue between the two, which it achieved. This dialogue served to lower hostility from the local authority and the scientists agreed that system monitoring was the most important intervention required. The company SOGEA opposed the BESSE project believing it would undermine its own work. Dispelling this perception improved relations.

**Lesson:** Communication is vital to unlock a deadlock. Knowledge brokers should prioritise establishing dialogue where this is lacking. Once dialogue is established, it may reveal that the perceived differences were not as great as initially thought and pave way for a resolution of the problem.

**Lesson:** Check that all parties understand the reasons for the knowledge brokerage. Active communication methods achieve this more effectively than passive methods. Active (face-to-face) methods allow one to clarify issues and permit the broker to check understanding.

#### Technical Documentation

The BESSE project provided a trigger to collect published and unpublished material relating to the sewerage system. This material was made available in a central archive improving access to knowledge which enabled optimal allocation of financial resources and facilitated better maintenance planning. A website was developed a website to act as a focal point for stakeholders, including the public, to access information.

**Lesson:** Provide stakeholders with as much relevant information and knowledge relating to the innovation. Full disclosure to everyone involved assists with cohesion building and establishing trust.

#### Problem Structuring

The BESSE project undertook a series of interviews with stakeholders to uncover all the relevant issues that the project would need to address.

**Lesson:** Carry out an audit at the outset to understand all issues concerned. The audit should include all stakeholders and aim to gain an understanding of their perspective on the issue.



## What do all the lessons mean for sustainable sanitation in Europe?

From its inception, BESSE was conceived as a project that had to be based on a broad empirical basis. It concerned an area — that of knowledge brokerage in sanitation — of which little or nothing was known. To do this, it was necessary to proceed by differentiating the sources of information and using various methods of data collection.

In the initial phases of research, the gap between new knowledge and its practical application was interpreted as merely the result of a **lack** of communication. It was assumed that the knowledge needed was already available and that the problem was mainly to make it known to practitioners. However, the realisation dawned that at least in the field of sanitation knowledge is not necessarily readily available. In addition, information on available technologies did not automatically orient users towards investing in technological innovation.

The research scope was broadened to include identifying which factors of a non-communicative nature produced the biggest obstacles to relations between researchers and sanitation practitioners. Knowledge brokerage performs several functions, which go far beyond the transmission of information: it interprets users' demand and provides information on different existing technological options; it promotes the creation of networks among sanitation stakeholders and practitioners so that knowledge can be shared easily and continuously; it may also organise practical demonstrations to help users understand how new knowledge or new technology can be practically applied.

Expanding on this approach prompted a deeper analysis of existing the literature, interviewing industry experts and conducting case studies in order to identify a far more extensive range of obstacles to innovation in sanitation in Europe than only relating to communication; a set of barriers that went well beyond the relations between the research community and the sanitation industry.

Serious widespread problems emerged not only in the way sanitation research is financed, designed and implemented, but also in the attitudes of technology providers and utilities towards innovation. There were also obstacles related to sanitation policies, and especially to those geared towards innovation. And finally we found that technological innovation in sanitation is greatly influenced by cultural factors (such as stereotypes, representations, professional cultures).

Knowledge brokerage should not just regard the transmission of knowledge from research to companies. Low levels of innovation in sanitation in Europe are in fact closely tied to the attitudes of and relations between a multiplicity of stakeholders involved in all stages of innovation. These include: utilities, which provide services; local governments, which in many cases own the infrastructures; national governments, which set framework laws and finance and direct research; supranational bodies, which establish regulations and standards; and territorial organisations, civil society organizations and environmental organizations, which may raise issues about land use and environmental impacts.

The final BESSE Newsletter will deal with Policy Guidelines on the role of knowledge brokerage for environmentally sustainable sanitation in Europe.

### Project Partners



International Water Association



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