DESIGNING AN ASSET MANAGEMENT GUIDELINE FOR THE DUTCH WASTEWATER INDUSTRY

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In the Netherlands, the collection and processing of wastewater is executed by 415 municipalities (collection) and 25 water boards (processing). Those organizations have signed an agreement to reduce costs. Implementation of asset management is supposed to play a vital role in this cost reduction. In order to facilitate the implementation of asset management, the representative body of the industry (Stichting RIONED and STOWA (Dutch acronym for the Foundation for Applied Water Research)) envisioned an asset management guideline tailored to the specific needs of the wastewater industry. However, due to the diversity in size and scope of the asset managers-to-be and the assets in scope it was not certain whether a single guideline would be possible nor if it would be cost effective. To get a clearer view on those issues before committing large sums of money, the process of creating the guideline was split up in two phases. The first phase would result in a roadmap: design of the guideline, high level planning of its realization and the contours of a business case for implementation of asset management by means of the guideline. The second phase would then consist of actually realizing the guideline. In this paper we describe the process we followed to arrive at the roadmap for the asset management guideline. The following can be concluded. Although the technical content of asset management for wastewater collection and wastewater treatment is very different, the process of management assets does not have to be different. By focussing on the asset management process there was no need to distinguish wastewater treatment from wastewater collection. By making the guideline a collection of relative independent elements, it would do no harm to the concept of the guideline if in future elements would be added or removed.

Key Words: Asset Management, Guideline, Wastewater industry

1   INTRODUCTION

In the covenant 2011-2015 [1] (In Dutch: Bestuursakkoord 2011-2015) between central government, municipalities and water boards it has been agreed upon to reduce the cost of the administration. One of the focus areas is water, which has a separate arrangement, the Covenant Water[2] (In Dutch: Bestuurakkoord Water). Key agreement of this pact is to reduce the cost of the water chain by € 380 million per year, on the total annual expenditure of about 3000 million euro. This number is based on a fact finding report on Efficient Water Management of 2010[3]. In this report, the implementation of asset management is mentioned as a key success factor. The cost reduction of 380 million euro per year is "only" 13% of total expenditure, and given the state of asset management in the industry[4] and experiences in other sectors this should not be an unrealistic target. However, a complicating factor is that the wastewater industry is not a single entity.

The wastewater chain is managed by 25 water boards and 415 municipalities, which are all independent public authorities with separate democratic legitimacy. The (physical) cooperation between the municipalities and water boards is organized by means of some 60 wastewater regions, the so called treatment circles. In general, treatment circles consist of 1 water board and multiple municipalities. However, the large municipalities often have more than one treatment circle, though the water board is not necessarily the same for all treatment circles within one municipality (borders between water boards and municipalities do not necessarily correspond). The role of the municipalities is to collect the wastewater (in essence a reversed distribution), whereas the water boards take care of the transportation of the collected effluent to the sewage treatment plants and the actual treatment. The treated water is discharged to surface waters. Within the industry there are significant differences between involved parties. The municipalities range in size from 1000 to 800000 inhabitants[5]. Some parties (like the water boards and large municipalities) have a separate department for asset management, in smaller municipalities asset management is generally one of the tasks of one or two employees. In one organization (Waternet in Amsterdam) both collection, transportation and treatment are executed in one hand.

Another complicating factor is that in the wastewater chain two very distinct types of asset management are needed[6, 7]. Since the wastewater collection is a reversed distribution infrastructure, and it possesses all characteristics that are typical for infrastructures[8]. The asset management to be applied should address the problems for infrastructure. The main cost in infrastructures is capital expenditure, about 60% of the total[3]. The wastewater plants, on the other hand, are not infrastructures. They are much more like factories: the assets are not passive but operated, and operational costs are the major part of the total expenditure, about 55%[3].

As a response to the covenants, a representation of the wastewater industry filed a proposal with STOWA (Dutch acronym for the Foundation for Applied Water Research) to prepare a guideline for the implementation of asset management. This guideline should help all organizations involved in the management of the wastewater chain with the design and implementation of their asset management practice .

There were two key challenges in the design of the guideline. The first challenge was with respect to the content. As mentioned, asset management for the wastewater collection is something different than for wastewater treatment and the guideline should respect that. On the other hand, given that both forms of asset management interact by means of the treatment circles (in an "n to n relationship" of water boards and municipalities) a standardized model would be very welcome.

The second challenge was purely the process. The representation that filed the proposal was just a working group, not a true representative body. Getting all involved parties to accept and implement the guideline would require more than just a good guideline. Choices would have to be documented carefully and attention should be given to the "marketing" of the guideline, and allow for future adaptations.

When the proposal was filed, it was not yet clear what such a guideline should look like. There seemed to be some implicit agreement on the form: the guideline should be a binder with separate sections, for example like the Infrastructure Management Manual [9]. However, it was suspected that creating such a guideline would require a significant effort. Therefore the proposal split the development of the guideline into two phases. Phase 1 was the development of a roadmap for the development of the guideline, phase 2 would be the actual development of the guideline itself. In this paper we describe the approach to arrive at the roadmap.

2   APPROACH AND FRAMING

The approach that was followed in the development of the roadmap was that of divergence and convergence. First ideas on what could be in the guideline would be collected (the divergence), followed by clustering and ranking ideas to arrive at the elements that should be part of the guideline. Clustering, however, is more an art then a science, as Morgan showed in his paper on clustering risks[10]. The best clustering depends on the goal of clustering. As the end goal of implementing asset management is a (significant) contribution to the cost reduction of € 380 million per year, the choice was made to structure the ideas along their "style" of cost reduction. This made it possible (at least in theory) to construct a business case for each of the deliverables, though in practice it was hard to go beyond a qualitative assessment of what contribution a deliverable would make.

2.1   Styles of cost reduction

According to Porter [11] Cost Leadership is one of the three strategies that can be chosen in order to be successful. Given its importance in the business context it is no surprise there is a wealth of literature on this topic. Earliest attempts to apply scientific principles to the design of production processes date back to Scientific Management of Taylor [12]. However, it was not the purpose of the project to identify all options for cost reduction in an top down approach. A structure that would help in assessing the value of ideas would suffice. The structure that "emerged" during the project is shown in figure 1.

The first style of cost reduction is improved decision making. If an organization is solving the wrong problem, only thinks of the standard solutions and does not optimize on the overall value, the projects the organization executes will be a waste of money, no matter how well they are executed. This style is thus about doing the right things.

But doing the right things is not the only style of cost reduction, there is in general also room for improvement in the way things are done, i.e. doing the things right. This style is about improving the efficiency of production and has to do with the organization of the work and the coordination between people. Borrowing form "Structures in five" [13] there are three applicable coordination mechanisms: standardization of the work processes, standardization of the output and standardization of competences. In short, standardization of work processes prescribes how things should be done and is in terms of efficiency improvement preferred, culminating into fully automated production plants. But this form of standardization is not always possible, sometimes local circumstances dictate that other methods should be used in order to arrive at the same output. In that case it is better to let the operator decide how to do things, and just prescribe the output that should be delivered. This is called standardization of output. However, in some cases it is not even possible to prescribe what should be made, as that is again determined by local circumstances. The operator then has to decide both on what and how. The only coordination mechanism available for those circumstances is standardization of competences, i.e. making certain that the operator has the right knowledge and skills to make the right decision. In practice, organizations tend to use all forms of coordination simultaneously.
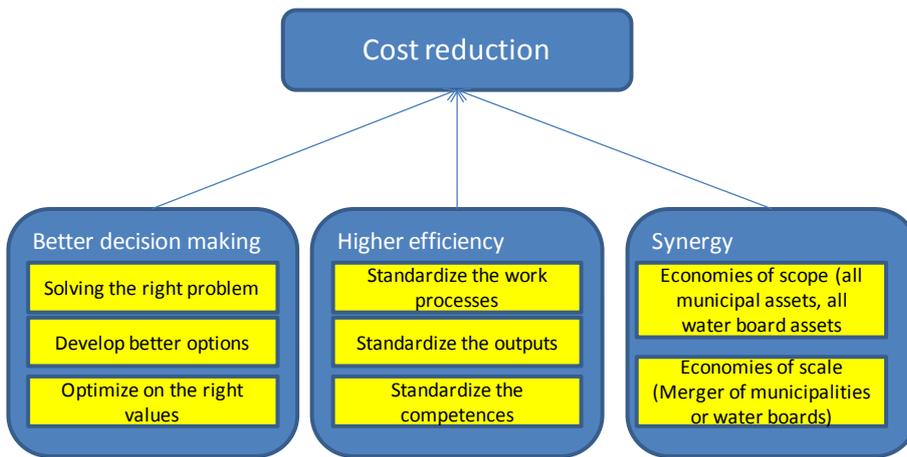
Figure 1: Styles for cost reduction

The third style of cost reduction is synergy. Some organizations active in the wastewater industry are relatively small, and combining activities may help spread some fixed overhead over a larger number of activities, thus lowering the average cost. This synergy can be achieved in two directions. Either the asset management scope is extended (e.g. water boards also manage flood protection and waterways, municipalities manage roads, buildings and so on), or the organizational scope is enlarged for example by mergers between water boards and between municipalities. The past years have shown a trend for merging. In 2005 the Netherlands contained 467 municipalities, per 1/1/2012 the number is down to 415[14]. With regard to the water boards, in 1950 there were 2600, in 2012 only 25[15].

2.2   The roadmap and the guideline

Between the idea of implementing asset management and the actual realization of the savings is a number of steps. The general scheme for the realization of intended effects is given below. The process starts with an idea to do something new or different. Based on that idea, a project is developed, culminating (according to PRINCE2) into a Project Initiation Document (PID). This PID is a detailed plan of action for producing the project deliverables. Once the PID has been approved, the realization starts. The project is finished if all the deliverables are completed. But this is not the realization of the intended effect. Those are only captured once the organization starts using the project deliverables.
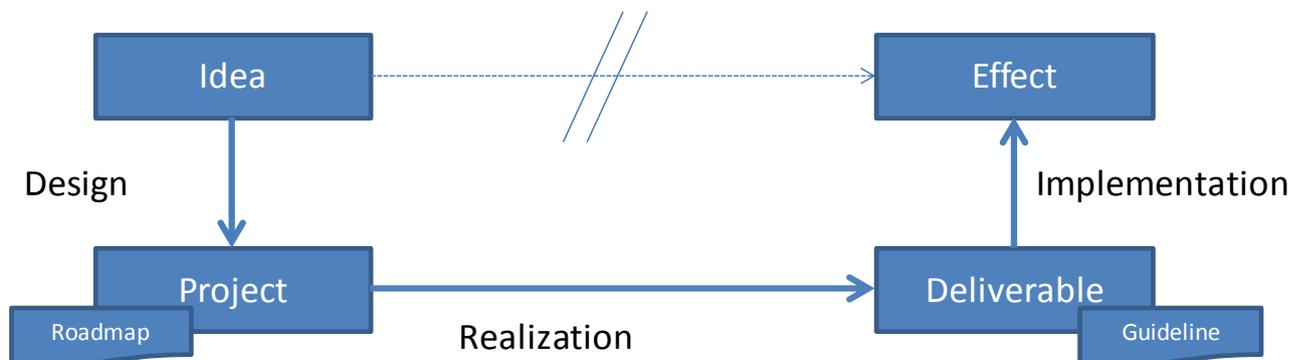

Figure 2: From idea to effect

If this scheme is translated to the context of the asset management guideline, the roadmap can be regarded as the project design, and the guideline itself as the deliverable. However, where a project is normally indivisible, this is not necessarily the case for the guideline. Some elements will have value on their own and will not depend on other parts. A better maintenance strategy will provide benefits even if investment decisions are still made the old-fashioned way. It does not mean the value of the whole cannot be higher than the sum of the values of the parts (like moving from optimized investment and maintenance decisions to optimization of the total cost of ownership), but there is value in the parts as well. The guideline therefore is more like a program (a collection of projects) than a single project. As a result, the roadmap is not a detailed project design, but the specification of the sub projects that make up the guideline, including their dependencies. The plans for the sub projects are out of scope. On the other hand, many of the sub projects will be relatively small (10s of days) which makes it hard to justify a full PID for every single one of them.

3   RESULTS

The first step of the process was to capture ideas that should be addressed in the guideline. However, the brainstorm was not a typical brainstorm with participants writing down term on post-its and putting them on the wall. Instead they were asked to write down (in a prepared template) the idea with a detailed description and a motivation. Only the idea was put on a post-it, but the filled in template was used in processing the session. This way much more of the rationale behind the idea could be captured. The brainstorm resulted in some 180 ideas, which were grouped into 34 clusters in the brainstorm session itself. Not all (clusters of) ideas could be translated directly into deliverables. Some ideas were more like questions than solutions. As the roadmap needed to be a plan for the realization of deliverables, some offline work was required. This resulted in 53 different potential deliverables. Each of the inputs of the brainstorm was linked to one of those deliverables.

However, not all potential deliverables would necessarily have to be part of the guideline. Selection of the potential deliverables was the subject of a separate session. In preparation for this convergence session, the list of potential deliverables was sent to the participants. The request was to grade the importance of the deliverable for the guideline on a scale from 0 (insignificant) to 10 (condition sine qua non). About 80% of the participants fulfilled the request. The scores are plotted in the diagram below (figure 3). The red line indicates the average grade, green is the high score (average plus one standard deviation), blue is the low score (average minus one standard deviation), and the purple line was the mark. The scores were split into 4 groups. Group one consisted of the elements for whom both the average and the low score were above the mark. There could be a discussion on the deliverable, but essentially everybody agreed that it should be included. The second group consisted of deliverables with an average above the mark, but a low score below the mark. Those deliverables were nominated to be included, but apparently some participants disagreed, so a discussion was needed. In this discussion focus would be on finding arguments for not including it. The third group was the opposite: it was nominated not to be included, but some participants saw the deliverable as important. The fourth group, finally, consisted of deliverables that should not be in the roadmap, as both the average and the high score were below the mark. The arguments that were exchanged during the discussion were recorded as comments in the product description. The end result was a selection of 24 deliverables to be included in the roadmap.
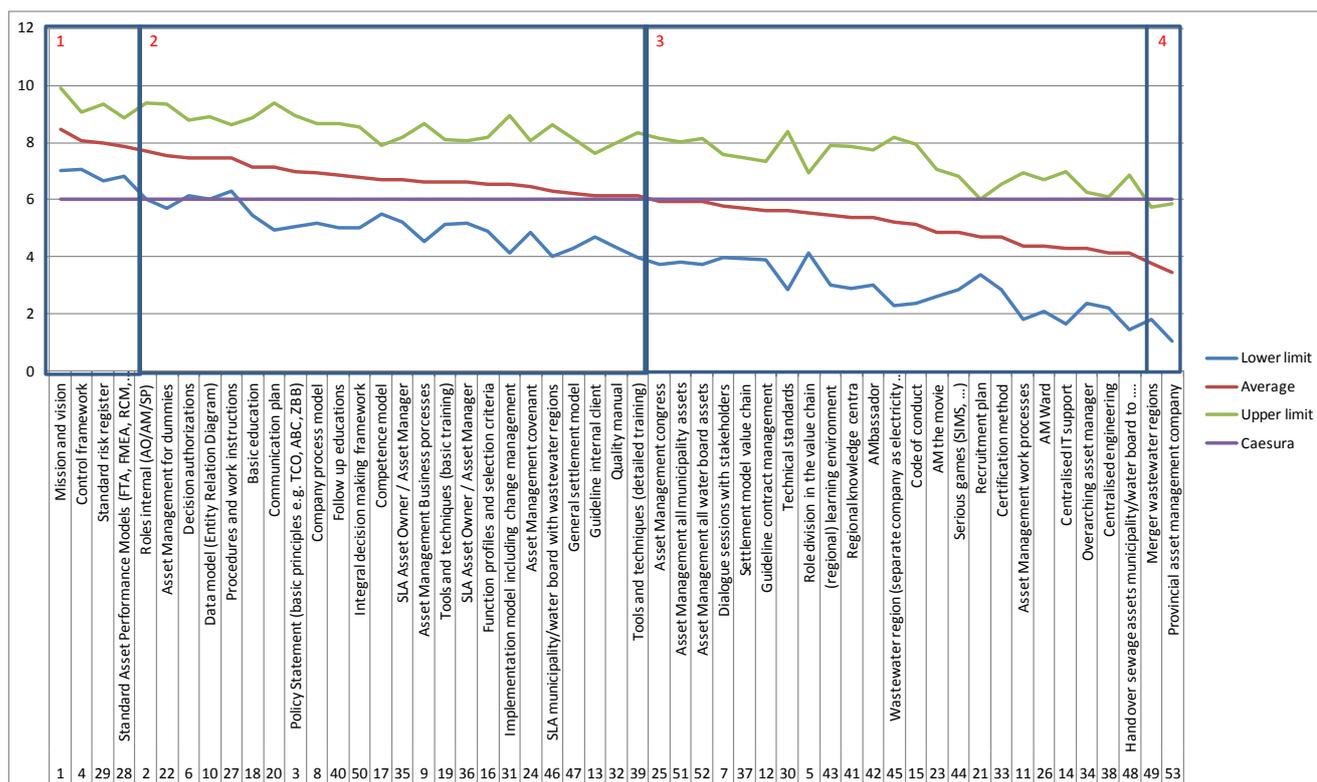

Figure 3: Results of prioritization

Based on this prioritization a proposal for the roadmap was made. The results are given in the table below. The scope of the roadmap is a little bit wider than only the guideline itself, some elements for marketing the guideline and a proof of concept of the guideline are included as well. These are called 'enabler' (see column 'Type').

Table 1: Elements of the guideline

Nr	Product	Aim	Type
1	Mission and vision	Ensure that the organization knows the asset management direction	Content
2	Roles internal (AO/AM/SP)	Ensure that in the organization it is clear what the roles, responsibilities of the roles Asset Owner / Asset Manager / Service Provider (AO / AM / SP) are	Content
3	Policy Statement (basic principles)	Ensure that the organization knows what the basic principles are as well as the way of work	Content
4	Control framework	Ensure that members of the organization know the decision making framework	Content
5	Authorizations and approvals	Make sure that the decision powers of the AO/AM /SP are clear	Content
6	SLA Asset Owner / Asset Manager	Ensure that it is clear what results the asset manager is expected to provide to the asset owner	Content
7	SLA Asset Manager / Service Provider	Ensure that it is clear what results the service provider is expected to provide to the asset manager	Content
8	Tools and techniques (basic principles)	Providing tools for selecting the right asset performance models and the selection of continuing education	Enabler
9	(regional) learning environment	Ensure that the people who work in the sector in asset management, learn in a structured way from each other supported by a content expert	Enabler
10	Company process model	Make sure that in the organization is clear what processes exist	Content
11	Asset Management processes	Make certain that in the organization is clear how the processes are linked to each other	Content
12	Asset Management detailed processes	Ensure that the organization is known in detail what the outputs, what responsibilities go with it and which information needs are related to the processes	Content
13	Standard risk register	Ensure that wherever possible the same risks are assessed so that the risk levels and mitigation measures can be compared	Content
14	Implementation model	Ensure that in implementation of asset management the organization is not reinventing the wheel	Enablers
15	Standard Asset Performance Models	Make sure that common decisions are taken the same way	Content
16	Procedures and work instructions	Ensure that people who work within asset management know how they should perform relevant activities	Content
17	Data model	A description which documents and organizes the business data for communication between team members including the entities and the relations	Content
18	Guideline internal client	Providing tools for designing and implementing the interfaces between asset manager and service provider	Enablers
19	Basic education	To provide a quick insight into asset management to all those who work or will work within asset management	Enablers
20	Competence model	Providing a tool in selecting people for certain asset management functions and assist in the preparation of the personal development plans	Enablers
21	Asset Management for dummies	Informing stakeholders (e.g. directors) on the operation and the importance of asset management	Enablers
22	Communication plan	Ensure that all relevant stakeholders in the right way at the right time can be informed	Enablers
23	Asset Management congress	Giving the kick off for the trial run of asset management	Enablers
24	Asset Management covenant	Giving respect and status to the introduction of asset management in the water chain	Enablers

The products match many requirements of the asset management standard PAS55[16]. According to this standard it is required to have an asset management policy and a related strategy, objectives and plans. The products like mission and vision, the policy statement and the control framework are an answer to these requirements. The process models, procedures, work instructions and authorizations and approvals cover quite a lot of sections of PAS55. Think of requirements on information management, asset management enablers and controls, structure, authority and responsibilities. Besides the standard captures explicit requirements on tools. Specific products which meet these requirements include the standard risk register and standard performance models. Outsourcing of asset management activities is both covered in the process models as in the guideline

internal client. The implementation of all products is supported in the implementation model and the (regional) learning environment. PAS55 (version 2008, page V) suggests that the awareness of the employees, competencies and cross functional coordination are essential for the implementation of good asset management. In order to (at least partially) meet these requirements, attention is given to this with the competence model, the basic asset management education, the learning environment and education on tools and techniques. Asset Management for dummies supports information requirements of relevant stakeholders. These need to be taken into account according to the standard. Their demands will be captured in the control framework as well. On page VI of the standard important interfaces such as motivation, communication, leadership and teamwork are mentioned. The products communication plan, asset management congress and asset management covenant fill in these requirements. The implementation plan will also deal with change management. When the products are defined and implemented, then the relative companies have taken a major step towards PAS55 certification. It however should be noted that certification is not the ambition.

4   CONCLUSION

Based upon this project, two conclusions can be drawn. First, even though the technical content of asset management for wastewater collection and wastewater treatment is very different, the group arrived at an understanding that the process of managing assets does not have to be different. This is further emphasized by a (more or less) shared value system between municipalities and infrastructures as they both represent the public interest. That meant that models for optimization could be similar, even though for municipalities focus would be on investment decisions and for water boards on maintenance and operations decisions. Summarizing this, by focussing on the asset management process there was no need to distinguish wastewater treatment from wastewater collection.

The second conclusion is that approach allowed for future flexibility. By making the guideline a collection of relative independent elements, it would do no harm to the guideline if in future elements would be added or removed. Given the explicit linking of the elements (both selected and non-selected) to the ideas of the initial brainstorm session, such a future discussion could be easily facilitated. Combined with the attention for marketing the guideline, this provided the group with enough trust that actually making the guideline would be valuable effort.

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