

Integrating flood management and sustainable energy

Lessons from five attempts to realize multifunctional Energy Dams

Introducing the case Brouwersdam

1. Introduction

The Brouwersdam is a 6,5 kilometers long dam in the southwest of the Netherlands. The dam was constructed in 1971 and is part of the international renowned Delta works which were constructed in reaction on the major flooding disasters in 1953 (Ministry of Transport and water works, 2001; Slager, 2010). The construction of the Brouwersdam was part of the national water security strategy to shorten the coastline of the Netherlands. After the realization, the Brouwersdam cut off the lake Grevelingen from the North Sea. Today, the dam is an essential work for water safety. Furthermore, the road on the dam is an essential link between the provinces of Zeeland and South-Holland. The dam also has a strong recreational function as it is a location for national concerts and its function as surf hotspot for the whole Benelux.



2. Restoring estuarine dynamics as opportunity for innovative energy production?

Onwards from the creation of the Brouwersdam, the water quality of the lake Grevelingen always has been an issue of concern for governmental agencies. For this reason in 1978, the Brouwerssluis was constructed to make a new connection with the North Sea. However, this connection proved not to be enough to provide the lake Grevelingen with enough oxygen. The lack of oxygen led to deterioration of

the water quality of the lake which caused negative effects for nature and economy (recreation and shellfish-fishery). This was shared and recognized in a series of deliberation meetings between the national water authority, the nature and recreation authority and the stakeholders around the lake Grevelingen in 2005. In these deliberation meetings also the possibility of a tidal energy plant was discussed (an idea originally launched by knowledge institutes in 2001). Because of the increase of ecological problems, the national water authority started in 2006 an exploration on the consequences of reintroducing estuarine dynamics in the lake Grevelingen (SNIP-exploration). As part of this investigation, in 2008 the national water authority together with the nature and recreation authority, and utility company Delta n.v. searched for the most effective way to solve the water quality problem. A culvert, and upgrading of the culvert into a tidal energy plant was explicitly one of the possibilities. At that time, the opinion was that a tidal energy plant could lead to less costs for public authorities (positive energy revenues). Because of the positive outcomes (in terms of restoring the water quality) presented in 2009, the secretary of state, after a strong regional lobby, asked in 2010 for a further exploration (MIRT-exploration) of reintroducing estuarine dynamics in the lake Grevelingen in combination with a tidal plant, a renewed waterway to the North Sea and a connection with the lake Volkerak Zoom which can be used to increase the water retention capacity of the Southwest Delta in case of high river water discharge. Hence, effectuation of the measures could not be realized because of a lacking budgets. In May 2012 the results of this further exploration were presented. The outcomes were that the measures (e.g. bringing estuarine dynamics back in the lake Grevelingen) were possible with a positive cost-benefit balance. A tidal energy plant in the breach to be realized in the Brouwersdam could function to produce energy, bring tidal dynamics to the lake Grevelingen (reducing the lack of oxygen), to stimulate regional economy and could function for pumping superfluous river water.

3. Outcomes

In response to the positive results of the MIRT-exploration in terms of the possibilities of restoring estuarine dynamics in combination with innovative energy production, the national government (again after a strong regional lobby) in 2012 decided to create a national planning document in which they wanted to fix a future strategy for both the lake Grevelingen and lake Volkerak Zoom. Furthermore, because of the high potentials (energy revenues, possibilities for export, synergetic investmens) of tidal energy in the Brouwersdam, in June 2013 regional authorities decided to create a steering committee Tidal energy plant Brouwersdam. This steering committee decided to further investigate the feasibility of a tidal energy plant in the Brouwersdam. For this reason, the project office proclaimed a 'call of expression of interest'. In this 'call of expression of interest-phase' private parties could express their interest for building a tidal plant. Subsequently, in November 2013 the project organization started a formal market consultation (pre competitive phase). In this market consultation the project organization organized a more intensive interaction with market parties in order to find out the feasibility of a tidal plant. This led to more consciousness about the construction costs of the plant. The market exploration did lead to a positive business case, despite the assumption that public and private stakeholders together finance the re-introduction of tidal range at Lake Grevelingen (by means of a culvert in the Brouwersdam). The asset manager currently (spring 2015) explores the possibilities of innovative contracts in which both the realization and the exploitation of the tidal energy plant are included. A concession-based tender is

considered to give private parties as much room for creative solutions as possible. This might lead to a combination of projects in a larger area. Next to this, in October 2014, the national government published a draft of the national planning document to further stimulate regional cooperation. In this document re-introduction of tidal range at Lake Grevelingen (as well as Lake Volkerak Zoom) is the recommended option for both the water quality and the water related regional economy. The possibilities for tidal energy production at the Brouwersdam are re-confirmed. So until now, there are no tidal plant facilities in the Brouwersdam. The breach in the dam is still under investigation in a market exploration. Building of a public private alliance for further project development is scheduled to start in a competitive phase in October 2015.

Observations and lessons learned Brouwersdam

1. Initiative and coalition-building

The initiative to realize an Energy Dam emerged out of a discussion to make a breach in the Brouwersdam cheaper, by adding additional functions. Next to this efficiency argument, the multi-functionality of a tidal plant seemed attractive. It was mainly a governmental idea to explore the possibilities of an Energy Dam. The strong involvement of the asset owner, asset manager, the Provinces of Zuid-Holland and Zeeland and the Municipalities of Goeree-Overflakkee en Schouwen-Duiveland can be explained because of their interest to enhance the feasibility of a breach in the Brouwersdam by enabling a tidal energy plant. Hence, the national water authority is also the responsible administrator for the water quality in the lake Grevelingen.

Much is invested in establishing a vital public coalition between two municipalities, two provinces and the national water authority. Also the Ministries of Economic Affairs and Infrastructure are involved. Hereby, the project team builds further on the tradition of broad participation in public plans within the southwest Delta of the Netherlands. The national water authority and the Province of Zuid-Holland together prepare the launch of a set of two public tenders, one for re-introduction of tidal range at the two lakes and one upgrading of the culvert Brouwersdam into a Tidal Power Plant Brouwersdam. They also organize the stakeholder process with the wider environment and develop an integrated proposal in which the several regional ambitions in combination are elaborated. However, this multi-actor setting is also seen as a challenge. Every public actor has its own stake to defend. Therefore, the public authorities have the ambition to make one actor responsible for the public private alliance building in the next phase (mandate).

There is an organizational separation between the decision-making about restoring the tide on the Grevelingen (National planning document) and on preparing the tidal energy plant. There are however strong connections between both. Project leaders regularly deliberate and possible issues are discussed in both the steering committee tidal energy plant Brouwersdam and the steering committee southwest delta. Hence, both steering committees have the same chairman. The in October 2014 published draft national planning document keeps as much room as possible (taking into account conditions like fish mortality, maximum tide, enz.) for incorporating a tidal energy plant facilitates the combination of a breach with an energy plant. Both processes have been smoothly synchronized.

At the same time this implies that realization of a tidal energy plant depends upon larger-scale decisions regarding the whole delta system and the water management of the various lakes and sea arms. Specifically, this means that internal project results have to be communicated regularly in other forums. And the other way around. Decision making on a higher level has direct influence on the project. For instance, the national planning document mentions 2020 as year for the realization of estuarine dynamics. This brings serious challenges and deadlines for the realization of the tidal energy plant. In this case actors have succeeded to come to simultaneous and coherent decision making.

Due to many uncertainties with regard to the availability of financial means for the restoration of the tidal dynamics, the decision-making process was several times postponed and reconsidered.

Bringing in preconditions during the process (for example fish mortality) is frustrating for private parties. At forehand, defining these preconditions seems to be important. In this case, the project team coped with this by defining top demands.

In this case there was a tension in relation to the development time of the culvert and the choice for upgrading it into a tidal energy plant. For public parties the development time of years is rather normal. For private parties this time span is very long. The consequence is that it is difficult to bind private parties for a long time span while at the same time this commitment is necessary to fully develop the innovative idea. For this reason the project organization aims to implement a concession based alliance in the next phase in which private parties act on equivalency.

2. Defining the business case

The private sector shows much creativity in exploring possibilities to enrich the business case. The scope of the business case has even been changed (also a simple breach in combination with a new recreational island is one of the possibilities). The business case has many different elements, mainly related to water quantity (the costs for a breach), energy production, recreation, fisheries and tourism, and exposure / regional employability.

The business case is developed with help of a joint fact-finding process with the private sector. That means that new insights about cost prices are used to redefine the business case. Due to the fast technical developments and different ideas about the most appropriate technic in the different consortia, there are much dynamics in the business case.

Flexibility of the project organization was crucial. This flexibility has three dimensions: process, content and structures. In this case the project team had to move along with decision making processes at other levels. At the same time national government worked on a National planning document in which spatial decisions for the whole area were made. In this document enough space for further development had to be realized in order to not frustrate the next phase of the market exploration of the tidal energy plant. These processes were handled in two different steering committees which both had powers. Sometimes discussions had to be conducted in the first steering committee, sometimes in the other. The project

organization had the capacity to upscale and downscale. Implementing innovative ideas is a continuous quest for the right chessboard.

The above mentioned flexibility means that the project organization never closes itself from the environment. The management has to steer on co-evolution and co-creation between environmental developments.

This flexibility also has a content component. In the project a tidal plant proved to be an expensive measure to improve water quality. For this reason the steering committee timely decided to expand the project scope. From that moment on, also only a breach was seen as one of the solutions. This is also seen in the end of the case period studied. The breach in the Brouwersdam was seen as only one of the measures in a larger area. The project was seen from a larger perspective. Private parties showed that when they could implement more public works, the total price could decline.

The project office is very active in branding the project as an innovative project with international appeal (next generation delta work and first tidal plant under low fall).

3. Arranging collaboration around realization

The case is characterized by a cautious exploration of the possibilities for public-private collaboration. In 2013 a Call for Expression of Interest' was published, which was answered by various consortia. After this a market consultation was started which provided much valuable information which was used to sharpen the scope of the project and to improve the calculations for the business case. After this consultation a process of joint fact-finding was started in which three consortia were asked to calculate the possibilities of a tidal energy plant. They were partly compensated for this effort, which contributed to the success of this phase. In the meantime a fourth consortium has been added. The joint fact-finding improved the assessment of the feasibility of the tidal energy plant.

Public actors are cautious with private involvement, because they fear juridical difficulties when the tender is started. Private actors are cautious because they are not willing to share information that ultimately is used by their competitors to realize the chosen plan. Furthermore they call in advance for public commitment to arrange for public conditions such as permits, energy concession and subsidies for development and exploitation of sustainable energy.

In this case cooperation between public actors seems rather obvious. Public parties through the decision making process came to *public alignment*. Hierarchic relations seemed to be absent. This public alignment was crucial in times when budgets were lacking and decision making was at stake.

There is still much unclear about how public and private actors will collaborate in the phase of realizing and operation of the tidal energy plant. Public parties focus on the public procurement of re-introduction of tidal range at the two lakes. There is a strong perceived need to remain at a distance and to give the floor to private actors for the upgrading of the culvert at Brouwersdam into a tidal power plant. The debate concentrates on the question how much room and which conditions the private actors do need to make the project a success.

The project organization in this case continuously has to search for a balance between openness and confidentiality. Openness has proven to be necessary to attract and interest private actors. At the same time confidentiality is necessary in interaction with private parties. They are very apprehensive to give away their innovative idea. In this case the project organization has secured this by both organizing broad deliberative meetings (in which actors were challenged for Joint fact finding) as well as confidential bilateral meetings between private parties in which project team members had to sign a confidentiality agreement.

Another debate is about how to organize a collaborative governance in the next phase. In the same area a project group on area development is active with the goal to search for financial means to restore the estuarine dynamics in the lake. This project group will enter the next phase like the project group of the tidal energy plant does. What should be the relation between the two project groups, how should they be governed are questions public actors are struggling with.

4. Exploitation and management

The asset manager currently explores the possibilities of innovative contracts in which both the realization and the exploitation of the tidal energy plant are included. A concession-based tender is considered to give private parties as much room for creative solutions as possible. Also other tenders are still possible. The project organization at this moment is preparing for public private alliance building in order to design the culvert/ tidal power plant Brouwersdam and to arrange all necessary conditions for public and private investment decisions in 2018 ultimately to enable the re-introduction of tidal range on Lake Grevelingen as well as tidal power production in 2020.

Note

The various projects are still “under construction” and the planning processes are rather dynamic. This description is completed early 2015. That means that still many aspects are not clear, or still highly changeable.

This description is based upon the master thesis of Hylke Bakker (M.Sc. Public Administration, Erasmus University Rotterdam) and completed by Corniel van Leeuwen (junior researcher).