Tidal power plant

Brouwersdam

Delta technology impulse for regional economy
The provincial authorities of Zuid-Holland and Zeeland, Rijkswaterstaat and the municipal authorities of Goeree-Overflakkee and Schouwen-Duiveland are committed to the building of a tidal power plant in the Brouwersdam and a testing centre for turbines in the Grevelingendam. Together with the corporate sector, research institutions and NGOs, they wish to serve several public and private interests at the same time. The result will be a new icon for Dutch Delta technology with a regional, national and international impact.

Generating sustainable energy
The additional advantage of building a culvert in the Brouwersdam is that it can be designed as a tidal power plant: turbines that generate electricity using the flow of water through the dam. It is expected that a tidal power plant in the Brouwersdam can generate green power for all 50,000 homes on Goeree-Overflakkee and Schouwen-Duiveland. In that way, the plant will contribute to the realisation of government policy targeting sustainable growth and fulfil the ambitions of both municipalities to be energy-neutral in time.

GREVELINGENDAM TESTING CENTRE
In addition to the tidal power plant, the two provincial authorities have joined forces with the national government and the corporate sector to work on the creation of a Grevelingendam testing centre. In laboratories and then in the field, trials will take place to determine which turbine technologies are most appropriate for use in the tidal power plant. The testing centre and large-scale application in the tidal power plant represent an ideal opportunity to put the spotlight on the region and The Netherlands Inc. as experts in the field of ‘energy dikes’.

“...the crucial first stages in getting a number of developments in the Southwestern Delta under way. Together with the provincial authority of Zeeland and the municipal authorities of Goeree-Overflakkee and Schouwen-Duiveland, we hope to boost the regional economy. More opportunities for recreation and tourism, and higher revenues for fishing are important factors in the achievement of that ambition. The need to take action is demonstrated by the involvement of the national government, the corporate sector, research institutions, NGOs and Europe.”

HAN WEBER, MEMBER OF THE PROVINCIAL EXECUTIVE OF ZUID-HOLLAND
“Zeeland lives with the water like nowhere else. For a long time we saw it as an enemy, but we now wish to embrace it as a friend. We are testing turbines in the Tidal Testing Centre with a view to building a large-scale tidal power plant later in the Brouwersdam. The expertise we will acquire can be used throughout the world in other deltas.”

BEN DE REU, MEMBER OF THE PROVINCIAL EXECUTIVE OF ZEELAND

“Goeree-Overflakkee aims to be an energy-neutral island by 2020. The tidal power plant is a perfect match for our mission to achieve that goal. Sustainable energy production can be used to supply green power to many homes both in our region and elsewhere. Furthermore, the tidal power plant can play an iconic role on the world stage for the Dutch Delta, putting Goeree-Overflakkee and the surrounding area firmly on the international map. That is a win-win situation for the entire region!”

AREND-JAN VAN DER VLUGT, ALDERMAN OF THE MUNICIPALITY OF GOEREEOVERFLAKKEE
The benefits at a glance

1. A boost for water quality
   Letting the tides return to Lake Grevelingen will improve the water quality, and that will be good for a lot of flora and fauna in the area.

2. A boost for the economy
   Letting the tides return will improve the conditions for recreation, tourism and fishing, and for the regional economy as a whole.

3. Sustainable energy
   It is expected that the tidal power plant in the Brouwersdam will generate green power for all 50,000 homes on Goeree-Overflakkee and Schouwen-Duiveland.

4. Dry feet
   In time, the tidal power plant can be used to pump excess river water into the sea, helping to protect the Rhine Estuary and the Drecht Towns from flooding.

5. Opportunity for innovation and exports
   A tidal power plant like this one, with a relatively small height difference and fish-friendly turbines, will be a global first. This innovative form of delta technology will be an outstanding export product for the Netherlands.

"We live in times in which functionality is becoming increasingly important. For example, we no longer want to use dikes exclusively for protection. Flood defences can also do several things at once. The plans for a tidal power plant in the Brouwersdam are an impressive example of this principle. They combine safety, water quality and ecology. At the same time, they allow us to team up with the regional authorities to generate sustainable energy. The government, research institutions and the commercial sector are using this tidal power plant as a way of co-creating innovative solutions for a sustainable society. And therefore an innovative and promising export product for the Dutch hydraulic engineering sector. Rijkswaterstaat is happy to contribute to innovations like this. The Brouwersdam; it gives you energy!"

JAN HENDRIK DRONKERS, DIRECTOR-GENERAL OF RUKSWATERSTAAT

"A tidal Lake Grevelingen is a major goal of the Steering Committee, which wants the Southwestern Delta to be Safe, Resilient and Vigorous. That can be achieved in Lake Grevelingen and the Volkerak-Zoom Lake by re-introducing a moderate level of tidal variation in Lake Grevelingen, allowing salt water to penetrate into the Volkerak-Zoom Lake, and linking the two waters. The tide will restore robust health to the water and that constitutes a basis for economic development. The tidal power plant delivers sustainable energy in an innovative way and contributes to flood protection in the long term."

JOHN VAN DEN HOUT, CHAIR OF THE SOUTHWESTERN DELTA STEERING GROUP, MEMBER OF THE PROVINCIAL EXECUTIVE OF NOORD-BRABANT
Protection for Rhine Estuary and Drecht Towns
As well as generating sustainable energy, the tidal power plant can also play a role in terms of flood protection in the wider area. When the tidal barriers in the New Waterway and the Hartel Canal, and the Haringvliet sluices are closed during storms at sea and when the rivers are also discharging large amounts of water at the same time, there is a major risk of flooding in the Rhine Estuary/Drecht Towns region. Storing water temporarily in Lake Grevelingen is a possible solution and, in addition, the plant can also pump excess river water to the sea. Storing water in this way would, incidentally, involve additional measures in the Volkerak sluices and in the Grevelingendam, and the national government needs to take a decision about these measures (see national structural concept).

Opportunity for innovation and exports
The tidal power plant in the Brouwersdam is unusual because of the relatively limited difference in the water level between the two sides of the dam (1.0 - 1.5 metres). Generating tidal energy cost-effectively and in a fish-friendly way with such a small difference has not yet been tried anywhere in the world. This is a fantastic opportunity to innovate and design new delta technology.

The culvert with the tidal power plant would cost an estimated 300 to 500 million euros, depending on the design of the plant. The provincial authorities and the national government are challenging market parties to devise an innovative and sustainable design.

NATIONAL STRUCTURAL CONCEPT
Working together with the provincial authorities, the water authorities, municipal authorities and NGOs, the national government is developing a structural concept for the coordinated development of Lake Grevelingen and the Volkerak-Zoom Lake. That concept involves the national government scrutinising the desirability and feasibility of the re-introduction of limited tidal fluctuations in Lake Grevelingen, the salinisation of the Volkerak-Zoom Lake, and water storage in Lake Grevelingen. Important focus areas in the national structural concept are flood protection and freshwater management (Delta Programme), water quality (Water Framework Directive), nature conservation (Birds and Habitat Directive), and economy and innovation (top sectors policy).

"Our aim is to be a holiday island by 2040, with a leading water economy that will link homes, work, care facilities and recreation in a sustainable way. The establishment of a testing centre at the Grevelingendam and the construction of the tidal power plant in the Brouwersdam are a perfect match for our ambitions. Both initiatives will put us squarely on the map, generate additional investment on and around Schouwen-Duiveland and ultimately result in a sustainable economic sector, as well as generating a major boost for the fishing sector and nature conservation. Together with the other government authorities involved, we are determined to take the combination of economics and ecology to a higher level!"

AD VERSEPUT, ALDERMAN OF THE MUNICIPAL AUTHORITY OF SCHOUWEN-DUIVELAND

"A tidal power plant in the Brouwersdam will be an important component in the new regional water system extending from the Brouwersdam to the Volkerak-Zoom Lake. That new system will make the area safer, encourage a new economy with promising prospects, and provide solutions for the natural areas in the region that are threatened and under pressure. Three provincial authorities, six municipal authorities, local area managers and entrepreneurs have pooled their energies in the area around the Volkerak-Zoom Lake to work on the development of a new vision: Waterpoort! The tidal power plant backs up this vision by re-introducing the tides, salt water and new water dynamics. The plant will produce more than just energy."

JAN HOOGENDOORN, CHAIR OF THE WATERPOORT INITIATIVE FLAKKESE SPUISLUIS
Timetable

2013-2014
Area development programme for Lake Grevelingen and Volkerak-Zoom Lake and a feasibility study (including financing) for the tidal power plant

2013-2014
Consultation of commercial parties and other stakeholders

Late 2014
National structural concept for Lake Grevelingen and Volkerak-Zoom Lake, including decision about the return of the tides to Lake Grevelingen

2015-2017
Selection and optimisation of turbine technology in the Grevelingendam Testing Centre

2015-2016
Permits, financing and investment decisions

2016-2017
Order for tidal power plant to a single consortium

2018
Start of work on tidal power plant

2020
Tidal power plant operational

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