

ENERGY FACTORIES – THE FUTURE FOR UK WWTs?



Richard Ratcliff, MWH water sector director, reviews how the UK water industry could learn from the Dutch rebranding of their sewage treatment works

In the Netherlands, no-one talks about building WWT or STW plants anymore – they talk about Nutrient, Energy or Water Factories. The potential of waste in Energy Factories appeals to the energy and environmentally conscious Dutch and has fired their interest in the wastewater industry. Rebranding waste treatment as a valuable and sustainable resource has resulted in increased support for government investment of public funds into research and development (R&D) and construction.

Collaboration across Dutch water companies and between water and waste sectors has driven this change. Unfortunately because of UK restrictions and major legislative barriers, our water industry is prevented from taking a similar holistic long term view. If these barriers were removed the UK could easily emulate the Netherlands approach.

The NEWs

MWH investigated the Energy Factory concept as part of an international research project for STOWA – the Dutch Foundation for Applied Water Research. We demonstrated that the future of sustainable Sewage Treatment Works (STW) is as Energy Factories because by 2030 they could be generating surplus energy. In fact we identified three new concepts – Nutrient, Energy, and Water Factories (NEWs) all of which will be sustainable and able to recover valuable resources from sewage waste, deliver sustainability and energy reductions of around 40% across the asset base.

The first of these concepts to be developed is the Energy Factory and 13 of the 26 water authorities in the Netherlands have already conducted feasibility studies. These show that by upgrading existing STWs, energy-neutral, and even energy-generating STWs, are technologically possible.

These concepts are taking off because the Dutch wastewater authorities need to continuously innovate to manage rising energy prices and energy efficiency agreements with their government. By committing to a two per cent reduction in energy usage, year on year, until 2030, they created the impetus for the industry to reformulate their wastewater treatment plants as Energy Factories.

Taking the long view

Medium term the Dutch are focusing on finding energy neutral solutions and longer term on

creating processes to fulfil their legislated requirements. This is driving innovations like the re-branding to help to future proof their industry. The UK, by contrast, is severely restricted by its five year investment and planning cycles and its set amount of money. If these restraints were removed, we could start to make changes and increase our power consumption and or generation from these types of sites in the UK.

Long term planning also leads to full lifecycle efficiencies as there are no 'stranded assets' and benefits can be accrued over 30 years. Our short five year UK investment cycle can lead to stranded assets and lost opportunities. Over 30 years you can look strategically at your asset base and look for radical solutions.

Dutch take calculated risks while UK plays it safe

The Dutch are not afraid to trial things. If it doesn't work they just move on to the next thing. In the UK, investment is seen as capital outlay which must generate a return. This makes us very reserved in terms of R&D into new technologies and in practice means we tend to play it safe using only proven or tried and tested technologies.

Despite being publicly owned, the Dutch utilities benefit from government commitment to research and development and wide-scale public support. The push to reduce energy consumption has been the catalyst for the Netherlands to invest in strategic R&D to develop new technologies they can share. This is giving them an impressive lead over other countries. As we no longer create such technologies in the UK, we are beginning to implement some of the new Dutch technologies. For example United Utilities, Severn Trent and Anglian Water are putting in low carbon Dutch technology for the treatment of high strength ammoniacal liquors.

Collaborative culture

Another big advantage the Dutch have is their collaborative culture especially among the Dutch water sector, utilities and government. The industry has developed generic energy factory flow sheets for short and medium term approaches, as well as the long term strategic NWater 2030 roadmap.

Many of the energy factory business cases have been developed with multiple consultancy

involvement, leading to best practise solutions for specific sites. Some water companies are coming together to develop energy factories in order to produce the most holistic and sustainable solution. This has even extended to joint collaboration with regional waste companies leading to concepts optimising the energy balance and maximising the ability to reuse energy (heat) sources. Tilburg will be the first Energy Factory - this project has recently been tendered - closely followed by a brand new Energy Factory at Den Bosch (400,000 population equivalent).

Waste as a valuable resource

Currently the focus in Holland is on Energy Factories, but the goal is to combine the three MWH concepts into one Nutrient, Energy and Water factory (or STW) focusing on waste as a valuable raw material.

The Energy Factory aims at maximising energy recovery from sewage sludge, whereas the Nutrient Factory aims at recovering valuable resources (phosphorus) from wastewater. This will be of interest to UK water companies as they now recognise the need to recover and recycle phosphorus as its global price increases and its global reserves reduce. The Water Factory aims at reusing wastewater for different purposes, such as process water, boiler feed water, recreation water and agricultural water. Each concept involves a different set of treatment techniques and the capital cost will play an important role in the selection of the treatment technologies within all three.

Given the UK Water Industry is increasingly under pressure to reduce energy consumption and maximise renewable energy generation this new Dutch approach should be of interest. I believe that with some changes to our mindset, increased collaboration, public and governmental support these NWater Factory concepts are very transferable to the UK water industry. In fact I don't think it will be too long before we see our first UK Energy Factories.

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