WSX-C14 – Enhancement costs – greenhouse gas emissions

Response to Ofwat's PR24 draft determination

Wessex Water
YTL GROUP

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Representation reference: WSX-C14

Representation title: Enhancement costs – greenhouse gas emissions

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1. Summary

This representation sets out our view in respect of greenhouse gas emissions enhancement funding for three areas:

- Water and waste - EV charging infrastructure
- Waste - nitrous oxide monitoring
- Waste - effluent heat recovery.

1.1. EV charging infrastructure

The draft determination included a base cost adjustment to support the adoption of lower carbon technologies. We believe that these costs should not fall under base allowance: installing EV charging infrastructure is a necessary part of enabling the transition to a low carbon fleet, it is a new requirement, and is not covered as part of the ongoing cost of maintaining our vehicle fleet. As such, we consider this activity justifies enhancement investment. We also believe that the cost adjustment is not sufficient to enable the level of EV uptake expected to meet the carbon reduction targets.

1.2. Waste – nitrous oxide monitoring

The draft determination discounted our nitrous oxide monitoring proposals; the reasoning given in the response to our query OFW-IBQ-WSX-015 being '*the schemes proposed to use existing technology to record data relating to nitrous oxide emissions and use this data to eventually manage and improve the operations of the asset*'. We do not believe it is commonplace yet to quantify Nitrous Oxide emissions in this way, as development around benefits and capability are in their infancy. We note that other equivalent programmes such as continuous water quality monitoring, are deemed eligible for enhancement funding. On this basis, disallowing enhancement funding for nitrous oxide monitors that use existing technologies, seems contradictory.

1.3. Waste – heat recovery

The draft determination also classified effluent heat recovery as an investment under the base allowance. However, we feel that the implementation of the technology and the new asset requirement is sufficiently innovative to be classed as enhancement.

Table 1 – Summary of changes requested

Data table line	Draft Determination base allowance	Our requested capital enhancement allowance
CW3. 127-129 & CWW3.177-179	£2.69m	£11.91m

2. EV charging infrastructure

2.1. Ofwat's approach to setting allowances

2.1.1. Ev charging infrastructure

Ofwat have chosen to apply a base cost adjustment allowance for all elements related to net zero and greenhouse gas (GHG) reduction. With regards to the investment required for electric vehicle (EV) charging infrastructure, a proportion of the £2.69m base cost allowance does not meet the requirements to ensure the level of use of EV's to meet the associated GHG reduction. We believe that the investment in EV chargers should fall under enhancement investment, as charging infrastructure is a new requirement that does not fall under current base allowances for transport. We request that the funding is also set to the level we requested in our plan at £9.625m.

We also challenge the position taken in the draft determination on EV charging that "some companies are likely to be delivering this through base expenditure allowances"; we consider this to be conjecture and have not seen compelling evidence to back-up this assumption.

2.1.2. Fit of Ofwat's chosen model

When considering EV infrastructure, Ofwat classed the chargers as part of transport and applied a base cost adjustment. We do not consider the base adjustment is enough to cover the need and believe that charging infrastructure should be classed as enhancement (as opposed to the vehicles that will be using the chargers). In our base allowances for transport we have decided to carry the uplift in costs for electric vans that are approaching double the cost of the internal combustion engine (ICE) version.

We accept that this difference in cost can be offset by the lower maintenance costs and running costs when:

- charged by our own infrastructure
- using our electricity rates.

In our base costs we have applied a reduction to cover the reduced running costs. Therefore, the whole life cost (WLC) of an electric van is similar to that of an ICE van in our base models. However, if we were to incorporate the costs of charging infrastructure into this base model there is little benefit of adopting EVs. The WLC will then far exceed that of an ICE vehicle and any prospective spend-to-save approach would not stack up.

Our externally modelled approach to the infrastructure required shows that, due to the rural nature of our region, more infrastructure is required than has been financially allowed in Ofwat's base uplift and reallocation. We expect the greatest efficiency and resulting productivity to come from charging at sites and depots.

We believe that the cost to install EV infrastructure should remain as enhancement investment as it is not part of current base allowances, and the uplift allowance would not be enough to make EV viable.

2.2. Required adjustment to cost allowance

We request that Ofwat adjusts our capital allowance for EV infrastructure investment to £9.625m.

2.3. Rationale

2.3.1. EV charging infrastructure efficient costs

When building up our cost basis for EV charging infrastructure we used Stantec as an independent resource to support our approach. Included below is an extract from their report detailing a breakdown of costs, in our

proposed approach we have substituted home chargers for increased numbers of chargers at more sites. We did this because as we stated in our plan there are a number of legal challenges to installing home chargers and they may not be suitable for the majority of employees who do not have off street parking.

Figure 1 – Stantec breakdown of costs for EV infrastructure

Ball Park Costs – EV Chargers

Assumes Rapid Chargers for future resilience – variable speed to enable battery management to be balanced with speed of charging.

Assumes home chargers

Includes plinth and simple connection to electricity supply- other costs considered separately.

Excludes staff turn over impact on home charging.

Sites	Notes	No Chargers	Cost Installed
WW Sites and Depots	22 Sites with 11 / 22KV AC chargers. Note 22KV could be DC – for periodic slow charging – assumed free-standing / dual chargers @7,500 each (note: could save if wall mounted @2,500 each). 1 dual charger per site except Pool and Kennet Way where there will be 2.	24	£180,000
	22 Sites with Dual Rapid Chargers* 60-240KW variable speed @ £56k each. (2 @ Pool & Kennet Way)	24	£1,344,000
Other sites (provisional sites)	17 Sites – Fast chargers @ £56k each.	17	£952,000
Home Chargers	Home 7/11KW wall chargers @2k each for vehicles that can not realistically be covered by permanent sites. 10 min diversion time to charge point (in cable chargers so can be taken with the vehicle if the employee leaves WW). Note. May be some employees without the opportunity to install chargers at home – may need to consider using commercial charging locations.	101	£202,000
Sub Total EV Chargers			***£2,678,000***

Ball Park Costs – Installation and Infrastructure

Includes:

1) Cabling from sub-station to the centre of each site to supply a rapid charger.
2) Any network upgrades / strengthening

Excludes:

3) Annual maintenance.

If we assume @£500/year for Rapid Chargers and £200/year for 22KVH Chargers. Total would be

Sites	Notes	No. Sites	Cost Installed
WW Sites and Depots	On site upgrades	22	Included in DNO Estimate
	DNO Network Reinforcement (Based on supplied DNO budget costs – March 2023) – Note may need to Review Wimborne little Canford – see next slide	22	£3,959,162
Other sites (provisional sites identified)	On site upgrades (further assumptions)	17	Included in DNO Estimate
	DNO Network Reinforcement* (figures not requested for these sites – based on average cost for sites above excluding Wimborne and Avonmouth) -£128k per site)	17	£2,176,000
Sub Total Installation			**£6,135,162**

Sub Total EV Chargers and Installation (22 sites +17 additional)	£8,813,162
Contingency @20%	£1,762,632
Total EV Chargers and Installation	**£10,575,794**

The following are quotes we requested for installation of EV chargers at our head office in Bath the quotes are from Park & Recharge.

Figure 2 – Option 1

Estimate / Summary of Cost*			
Element	Unit Cost	No. of Units	Sub Total
Assessment & design fee	£1,559.00	1	£1,559.00
DUO EV charger (22kW)	£2,750.00	4	£11,000.00
Tritium RTM75 charger (75kW)	£29,490.00	1	£29,490.00
EV charger feeder pillar (250A)	£4,951.00	1	£4,951.00
Pre-moulded plinth (AC)	£390.00	3	£1,170.00
Pre-moulded plinth (DC)	£880.00	1	£880.00
Barriers / Signage/ Bay marking	£1,980.00	1	£1,980.00
Electrical installation / civil Works	£61,052.00	1	£61,052.00
		Total	£112,082.00

Figure 3 – Option 2

Estimate / Summary of Cost*			
Element	Unit Cost	No. of Units	Sub Total
Assessment & design fee	£1,559.00	1	£1,559.00
TRIO EV charger (7.2kW Wallbox)	£2,550.00	4	£10,200.00
DUO EV charger (22kW)	£2,750.00	3	£8,250.00
EV charger feeder pillar (250A)	£4,951.15	1	£4,951.15
Pre-moulded plinth (AC)	£390.00	2	£780.00
Barriers / Signage/ Bay marking	£2,675.00	1	£2,675.00
Electrical installation / civil Works	£71,433.00	1	£71,433.00
		Total	£99,848.15

This demonstrated that we have taken into account the best options for customers and that through a detailed study and quotes that our costs are efficient.

2.4. Why the change is in customers' interests

The adoption of low carbon transport is key to meeting our net zero targets. Providing access to suitable EV charging infrastructure is paramount to delivering a low carbon fleet and also minimising the drop in productivity resulting from longer charging periods.

3. Waste – nitrous oxide monitoring

3.1. Ofwat's approach to setting allowances

3.1.1. Waste – nitrous oxide monitoring

Ofwat have chosen to apply a base cost adjustment allowance for all elements related to net zero and greenhouse gas (GHG) reduction. With regards to the investment required for nitrous oxide monitoring, the draft determination assessed our proposed investment as using existing technology to manage and improve the operation of assets.

We do not challenge that this is the case however, we do not believe that it is commonplace or standard practice to operate in this way. The quantification of nitrous oxide emissions from different treatment processes, and the development of benefits (such as process optimisation) and understanding possible capabilities are in their infancy and far from being fully understood. We believe the proposed approach is still innovative and should be classed as enhancement investment for these reasons and has not been delivered previously.

3.1.2. Fit of Ofwat's chosen model

We believe that the enhancement investment is valid for our approach to the use of nitrous oxide monitors. The technology that we envisage will be sensors that provide continuous measurement of N_2O in solution in the aqueous phase. We believe this should not be covered under base allowance due to the following points:

- In the field quantification is necessary for emissions reductions, as it permits understanding of the circumstances that produce spikes in N_2O emissions;
- While the technology has been demonstrated at water recycling centres in the UK through experimental monitoring in the last few years, it is not yet widely used technology. It cannot be considered to be standard practice;
- We have not been granted enhancement funding in the past for this activity;
- Real-world monitoring paves the way for subsequent digital twin type solutions but is a necessary first step e.g. for training algorithms.

We agree that our rejected N2O schemes would be using a product that is readily-available (Unisense probes). However, we believe it is a premature assessment to characterise it as "Use of 'existing proven tech' to improve operations of asset. This comes under general maintenance and base spending":

- While the sensors themselves are 'proven' at being able to detect N2O in solution, they are only one aspect of the envisaged work. The relationships between detected N2O and operating conditions is not yet well understood and varies from one site to another;
- Monitoring is not yet widespread, and monitoring plus associated control measures is definitely not standard practice. Monitoring using these devices has only happened for a few years in the UK, at a relatively small number of sites in the UK, on a trial / exploratory basis;
- Monitoring at several sites would be a first-time activity for us. As noted above, we have not received enhancement funding for this previously. It is very different to other activities where initial enhancement is used for the first stage, and continuation is funded from base.

We note that several of the projects that passed Ofwat's net zero challenge assessment involve companies that already received funding for the same technologies via the Ofwat innovation competition:

- Anglian: 5 MABR projects; which correspond to the Triple Carbon Reduction innovation competition project
- Severn Trent – photocatalytic conversion, corresponds to the Net Zero Hub innovation competition project

We are keen to learn from these initiatives. However, we would appreciate assurance that leadership of Ofwat innovation competition projects does not have a bearing on subsequent AMP cycle enhancement investment for greenhouse gas emissions reductions.

3.1.3. Additional factors not considered

Ofwat have allowed enhancement funding for other programmes where monitoring will be installed. In the case of continuous water quality monitoring Ofwat have allowed enhancement funding for monitors that use existing technologies and have been used previously in a widespread manner however the outcome and approach to their use is new. We do not see a difference in the approach when considering continuous water quality monitors and nitrous oxide monitors, yet continuous water quality monitors have been granted enhancement funding.

3.2. Required adjustment to cost allowance

We request that Ofwat adjusts our capital allowance for nitrous oxide monitoring investment to £1.26m.

3.3. Why the change is in customers' interests

As this is a new, developing area of work, neither the costs nor the benefits are well established, and the supply chain is relatively small. Currently, emissions are very broadly estimated and vary widely; through this work we seek be in a position to better quantify our emissions and better inform corrective action or management practices. Moreover, we are seeing entrants to this field from the arena of big data, digital twins and predictive analytics / machine learning and we will learn from these approaches during 2025-2030, as they offer the prospect of managing sewage treatment to minimise nitrous oxide based on modelling and the use of proxy measurement, rather than continuous real-world measurement of nitrous oxide itself.

We will have better understanding at the end of this work of what emissions reduction can be achieved or sustained through future management of the WRCs monitored during the 2025-2030 assessments. It will also help us estimate savings from WRCs that have not been monitored but have similar processes. We also understand that some WRCs may be more complicated than others. Nevertheless, our proposed approach is flexible and will help us build up a picture about each WRC which should enable more accurate emissions calculation based on this 'ground truthing'.

The cost involved for installation and monitoring is relatively well understood. We will seek opportunities for efficiencies and competitive quotes on a per-unit basis with a larger volume of installation. We have also included added assumptions around the time required carry out site visits and calibrate sensing tools. At present, we have not assessed potential cost savings from reducing nitrous oxide emissions. In the future, with a better understanding of the costs and benefits of this activity, we will be able to better compare N2O reduction with other monetised reduction and the cost to offset residual emissions as part of our corporate commitment. However, we are fully aware that this would not count towards the common performance commitment for 2025-30.

4. Waste – heat recovery

4.1. Ofwat's approach to setting allowances

4.1.1. Waste – heat recovery

Ofwat have chosen to apply a base cost adjustment allowance for all elements related to net zero and greenhouse gas (GHG) reduction. With regards to the proposal for enhancement investment for effluent heat recovery, Ofwat have suggested that this investment does not s the against the net zero driver as it is related to heating which is covered under base expenditure. We believe that our proposed approach involves innovative methods and entirely new assets. For this reason, we consider it to be an appropriate recipient for enhancement funding.

We also challenge the position taken in the draft determination related to schemes addressing heating (as for electric vehicle charging schemes), that "some companies are likely to be delivering this through base expenditure allowances"; we consider this to be conjecture and have not seen compelling evidence to back-up this assumption.

4.1.2. Fit of Ofwat's chosen model

Our bids for an effluent heat recovery unit, exited at phase 1 with all other energy & transport proposals. As noted above this phase (Net zero challenge eligibility) failed proposals if they were deemed to be related to other cost drivers or not related to net zero. We believe that the net zero technology review conducted for Ofwat notes the

contribution of this technology to the net zero agenda, supporting low-grade heat uses onsite that might otherwise require import of natural gas (which is the case for the site we envisage) and that there is "a small number of heat recovery systems reported by UK water companies". The same review places on-site heat recovery in its shortlist of preferred technologies.

Our proposal to install a 2MW heat pump that draws heat from the treated effluent downstream of the secondary treatment process at Avonmouth water recycling centre would supply heat to the mesophilic anaerobic digesters' hot water circuit to as much as 50 degrees Celsius. This reduces the need to use the CHPs and an associated boilers as a heat source. This overall approach presents good value, deriving renewable from a plentiful onsite source and reducing exposure to external energy markets, while sustaining the use of current digester assets. Estimated cost savings are linked to the reduced gas consumption (minus the additional electricity required to run the heat pump); these are based on related forecasts of energy prices and an estimate of ongoing maintenance costs.

Effluent heat recovery involves entirely new assets and an innovative approach for decarbonising energy use. Being a new technology for us there is also some delivery risk associated with first-time implementation. Consequently, we think this is a good candidate for enhancement funding. Other complementary work to reduce gas use will be delivered through base allowances.

4.2. Required adjustment to cost allowance

We request that Ofwat adjusts our capital allowance for heat recovery investment to £1.026m.

4.3. Why the change is in customers' interests

This technology enables reduced gas use, by taking heat instead from the high volumes of treated effluent exiting the sequencing batch reactors. This is an innovative renewable energy method which would involve the creation of new physical assets. In the medium to long term we believe this represents a cost-effective approach to reducing our carbon footprint. The heat recovery equipment will be source from M&E sector vendors, using standard procurement processes. Potential cost savings are linked to the reduced gas consumption (minus the additional electricity required to run the heat pump); factoring in forecasts of energy prices and an estimate of ongoing maintenance costs.

5. Our use of the cost adjustment

Noting the following from the draft determination:

> "We applied the median reduction in tCO2e (-2.5% for water and -2.5% for wastewater) to all companies to arrive at the benefits companies are expected to deliver through the net zero base cost adjustment. The same percentage reduction was applied for both water and wastewater as companies split the costs for low-carbon heating and electric vehicle charging infrastructure between water and wastewater. We applied the median unit cost of carbon (£757.82 per tonne for water and wastewater) to determine the cost adjustment for each company."

Our expectations with this arrangement are shown below:

	Water	Wastewater
Base uplift benefits (with 2.5% base uplift adjustment)	776 t	2,815 t
Median unit cost of carbon	£757.82	£757.82

Base cost adjustment	£0.588m	£2.134m

If our enhancement bids were to still not be funded from enhancement, we would use the base cost adjustment as follows:

- Implement effluent heat recovery at Avonmouth
- Enact a scaled-back programme of electric vehicle charging infrastructure.