Let's start with some facts

- Water industry emissions about 5 million tonnes CO2e per year – about 0.8% of the UK total

- Of course, there are drivers pushing these up – growth, quality, WFD, increased flooding

- But other drivers helping to get these emissions down

- Some are financial – rising and volatile energy costs, CRC, FiTs, ROCs, etc
- Others are less tangible but still important - regulatory reporting, reputation, attracting employees, innovation, and not forgetting a CEO that wants to leave a legacy

- These existing drivers and incentives mean that, as Howard has shown for SVT, emissions beginning to fall and projected to fall further. This is true for most companies, especially WaSCs

- As grid decarbonises, industry's emissions will fall naturally, probably by another 10% by 2020

- Of course, this 5 million tonnesdoesn't include heating of water for domestic use (about 5-10 times the figure for annual reported emissions)

- The figures also conceal what's going on with embodied emissions, which are generally not reported

- These are roughly 12 million tonnes per AMP – over twice as much as industry's annual emissions

- I want to focus for a minute on all these scope 3 emissions, since there are far fewer incentives for reducing these

- Currently, scope 3 emissions predominantly cover asset construction, maintenance & renewal, purchased materials like chemicals and outsourced activities

- But boundaries of scope 3 emissions are constantly shifting. They potentially cover waste disposal, catchment activity, heating of water in the home, sludge-to-land, carbon storage and sequestration

- The opportunities here are significant, with potential for larger emissions reductions than is the case by focusing on operational only

- It's an especially important area because capital investment is also locking in future operational emissions so what we build today and how we plan assets will determine operational emissions for years or decades to come

- Also, the structure of industry changing – as retail competition develops, one area where service providers will compete for customers is around resource efficiency

- But whilst we understand and are actively managing operational emissions, we don't yet fully understand or consistently measure or report embodied or scope 3 emissions

- So, what can companies do to measure and manage these emissions?

- Fortunately, there is some excellent UKWIR guidance on emissions in this area, written by MWH, that all companies can follow

- Companies can then cost these emissions and ensure the value is properly included in decision making. In fact, Owat could explicitly state it expects companies to do this

- Then we might see broader adoption of some currently novel approaches – like not building new assets in the first place!

- This could encompass
    - catchment management – which itself covers a whole host of acitivites
    - water efficiency
    - use of sensor technology
    - SUDS
    - real time monitoring and consenting
    - catchment consent trading
    - etc

- Many of these solutions are cost negative, others are cost beneficial – so if they are understood, shouldn't need any additional incentives

- To help identify them, we need to scrutinize and maximize efficiency of capital programmes by engaging with the supply chain as some companies are beginning to do (Dave Riley will talk about what Anglian is doing)

- Companies can also ask their supply chain to provide an energy and carbon balance assessment for all capital projects; and evidence of a review of opportunities for project carbon reduction, according to the '*avoid, reduce, replace, mitigate'* hierarchy

- Perhaps with a financial bonus or penalty based on the deviation from agreed emissions (or energy use)

- They can look for accreditation of individual goods and services to recognised measurement standards like PAS 2050

- The industry could collectively push for better info on carbon embedded in specific resource inputs like chemicals

- There are markets for carbon, biodiversity and other areas which companies could use to their financial and carbon advantage – they could work with customers to retrofit homes and package up the carbon savings to sell to others. They could get involved in provision of biodiversity offsets, with additional benefits from sequestered carbon

Conclusions

- Yes there's more we need on operational emissions – support for pumped hydro, manage methane and NOx, and recognition for purchased renewables

- There is undoubtedly more scope to reduce these andplenty of drivers and incentives for continuing to do so.

- Our work on energy factories (in Holland) shows it is technologically possible for large WWTWs to be energy positive through a combination of measures

process optimization, combination of enhanced AD with CHP engine, reuse of heat, enhanced primary sedimentation (addition of chemicals), thermal hydrolysis of sludge, recover phosphorous (nutrient factory), reusing wastewater (water factory)

- But we really need to take a whole-life approach, and think aboutembodied and wider emissions. This is the area with the biggest potential for carbon reduction gains

- Actions are not costly; in fact they will save companies and customers money. But they require better understanding of where emissions come from, and a change in mind-set and culture – companies becoming involved in urban design, rural catchment management, large-scale domestic retrofitting