

Rising to the carbon challenge



Dr Bob Stear
Severn Trent Water

Objectives

- To remind you of the carbon challenge
- To remind you of some carbon basics*
- To share with you how Severn Trent Water is approaching the carbon challenge
- To convince you to be a Martian for a while
- To Leave you with some questions and challenges to consider over the next two days



Before I go all Alien...

- I'm a Civil Engineer (ish)
- Research into flushing toilets with seawater
 - and treating the stuff with Activated Sludge
- Severn Trent Water wastewater and clean water Operational Management
- Wastewater Strategy Manager (end of PR09)
- Planning and Performance Manager currently
 - R&D, Strategy, Capital Planning, Performance

Context

- The water industry will contribute towards delivery of the Climate Change Act's target for 2050 of reducing UK greenhouse gas emissions by 80% from 1990 levels



What is carbon? #1

- Obviously we're just being lazy...
- When I talk about carbon here I mean CO₂ equivalent
- We might measure it in ktCO₂e/year



What is carbon? #2

Operational Carbon

- Relates to carbon produced by our assets.
- E.g. By using electricity, fuel or chemicals

Embedded Carbon

- Relates to the carbon produced during construction
- E.g. In the concrete, steel etc

What is carbon? #3

Operational
Carbon

- Carbon Reduction produced by
- Green House Gas emissions (GHG), fuel or
- (CR) chem

Embedded
Carbon

- = Embodied carbon produced during construction
- E.g. In the concrete, steel etc

Easy right?

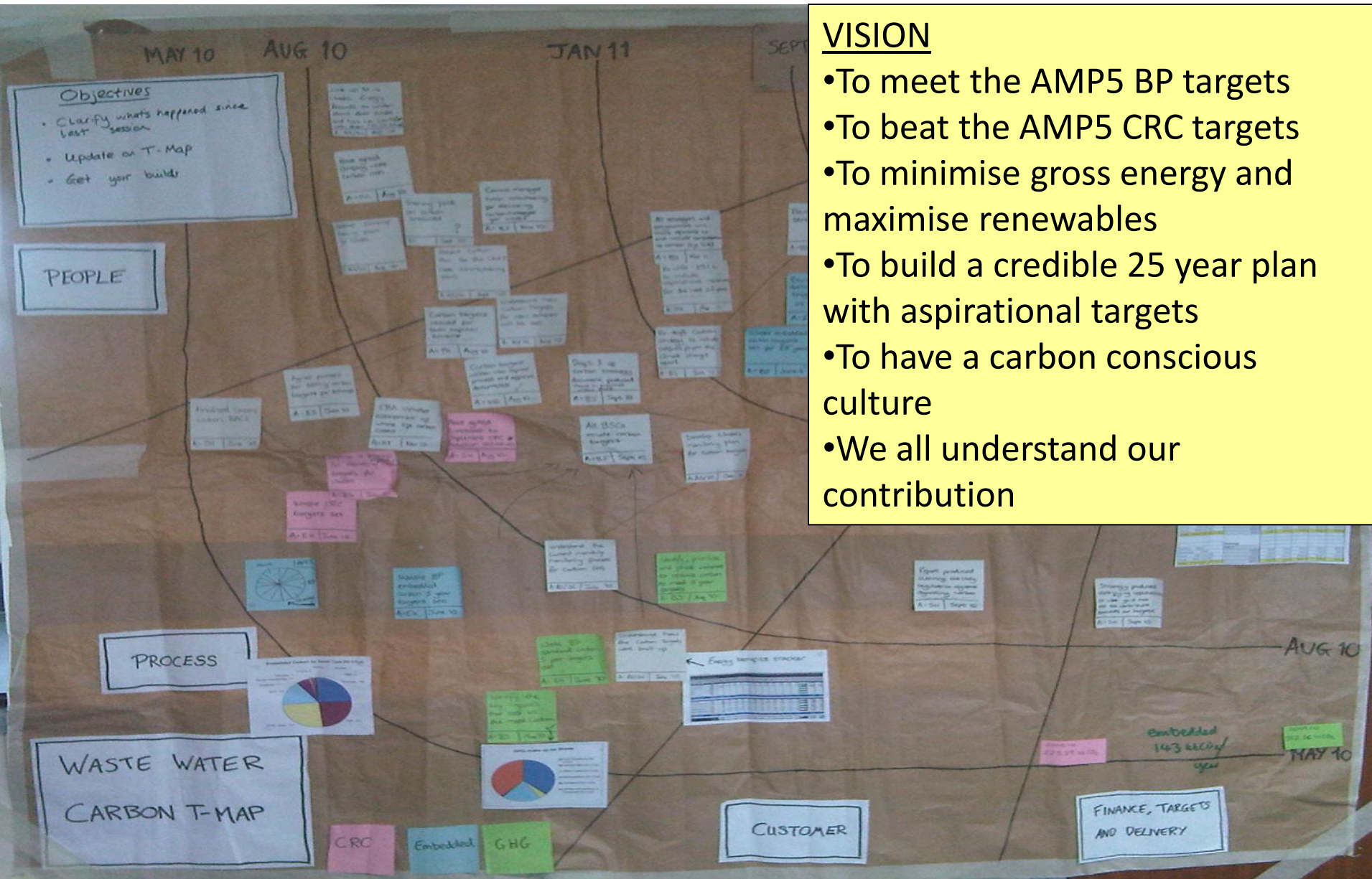
- Um..no, actually.
- What's the extent of your impact?
- Where do you draw the line?
- So I find 'carbon' quite complex
- So how are we tackling in Wastewater Services?



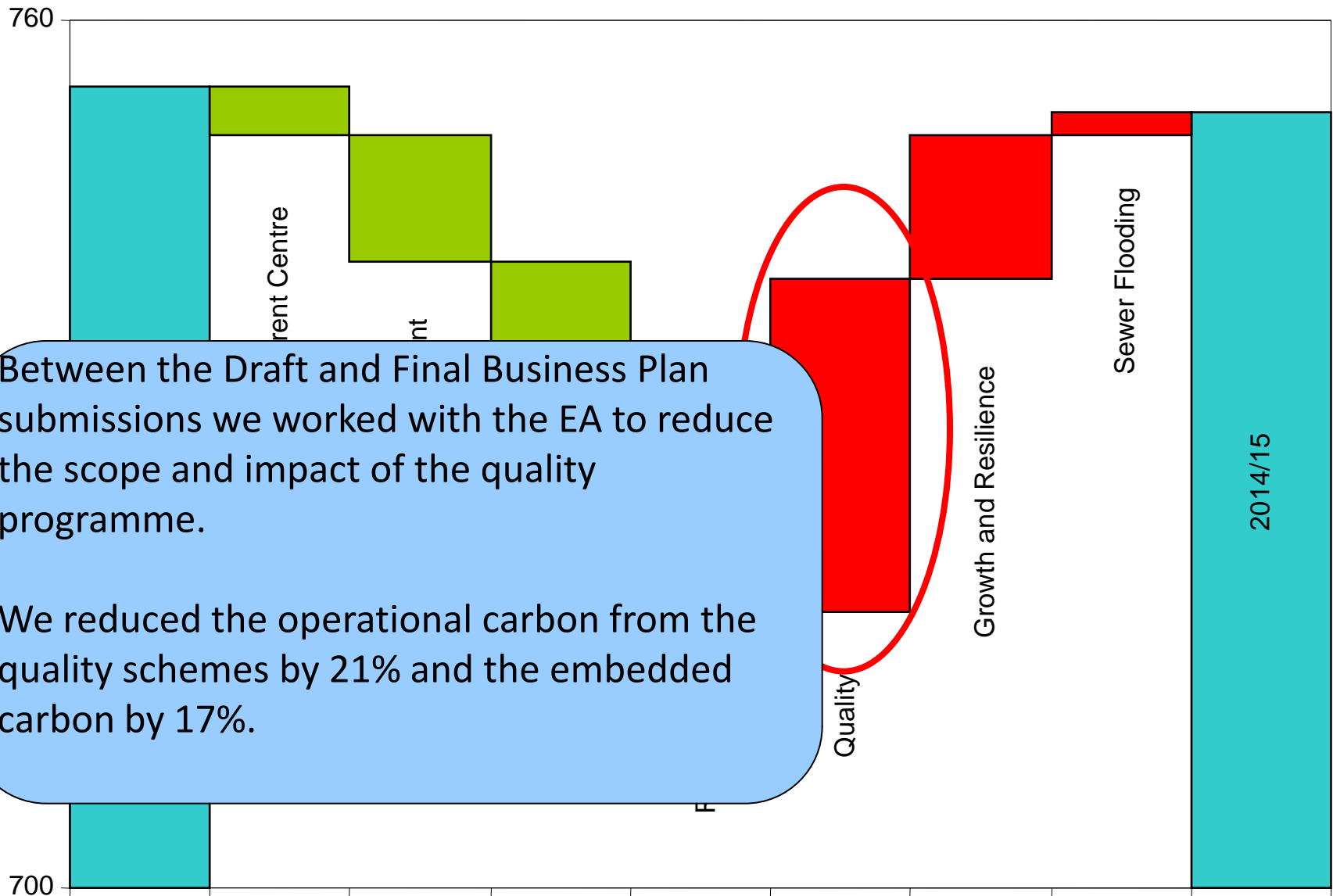
We use a 'Transformation Map'

VISION

- To meet the AMP5 BP targets
- To beat the AMP5 CRC targets
- To minimise gross energy and maximise renewables
- To build a credible 25 year plan with aspirational targets
- To have a carbon conscious culture
- We all understand our contribution

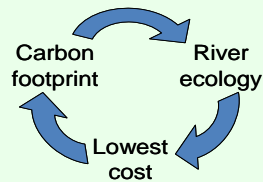


Operational GHG emissions in AMP5



Between the Draft and Final Business Plan submissions we worked with the EA to reduce the scope and impact of the quality programme.

We reduced the operational carbon from the quality schemes by 21% and the embedded carbon by 17%.



Balancing Carbon & Ecology Programme

STW and EA joint vision:

“By working together we will meet the requirements of the WFD at least carbon footprint and least cost to customers”



Some opportunities from the trials

We can operate STW dynamically



We haven't got the right assets. We don't have enough flexibility in the operation of STWs to realise maximum savings when treating to relaxed limits. X

Changing the operation of an ASP, and causing 'stress' to the system may cause an increase in Nitrous Oxide emissions – a greenhouse gas 298 times more potent than Carbon Dioxide. X

There is only a small amount of energy saved in treating to a relaxed standard. X

High river flow conditions are infrequent and of short duration. X

Ammonia and temperature are linked creating seasonal or temperature dependant opportunities.



Modelling River Quality with SIMCAT

Can we combine STWs growth predictions/ knowledge of available headroom capacity with the EAs information on environmental capacity to influence development?

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likely to get SMP6 and

Can we estimate the cost of removing... sewage treatment... What is the relative contribution to meeting the WFD targets? What are the impacts of the associated metal limits?

What cost... doing our part to meet the WFD?

Modelling River Quality with SIMCAT

Where are STW likely to get tighter consents in AMP6 and beyond – so we can plan maintenance?

Can we combine STW predictions/ k available he with the EA en

likely to get AMP6 and

Can we of removing sewage treat What is the rela contribution to meeting the WFD targets? What are the impacts of the associated metal limits?

cost doing our part to meet the WFD?

Modelling River Quality with SIMCAT

Can we understand the impact of removing phosphorus from sewage treatment effluent? What is the relative contribution to meeting the WFD targets? What are the impacts of the associated metal limits?

Can we combine STP predictions/ k available he with the EA en

likely to get MP6 and

Can we of removing sewage treat What is the rela contribution to meeting the WFD targets? What are the impacts of the associated metal limits?

What cost doing our part to meet the WFD?

Modelling River Quality with SIMCAT

Can we take a length of river or a catchment and review the consents to investigate the most cost effective way of doing our part to meet the WFD?

Can we combine STP predictions/ k available he with the EA en

likely to get MP6 and

Can we of removing sewage treat What is the rela contribution to meeting the WFD targets? What are the impacts of the associated metal limits?

cost doing our part to meet the WFD?

CARBON NOW



LOW CARBON WORLD

| LEVEL OF INVOLVEMENT REQUIRED | STW | Midlands EA | National EA | UK Government & EU |
|-------------------------------|---|--|---|--|
| POTENTIAL TO REDUCE CARBON | | | | |
| EXAMPLES OF INITIATIVES | <ul style="list-style-type: none"> •Optimisation on sites •Review of engineering standards •Nitrous Oxide investigation | <ul style="list-style-type: none"> •Over effective permits review •WFD compliance prioritisation in line with STW Capital Maintenance plans •Promotion of seasonal consents | <ul style="list-style-type: none"> •Revisions to enforcement •Using flexibility of permits •Projects identified through national workshop – 9th September | <ul style="list-style-type: none"> •WFD revised to include carbon considerations •Introduction of unionised ammonia consents •Changes outlined in “Changing Course” |
| THE CHALLENGE | <p>ANY ONE OF THESE IDEAS COULD REDUCE CARBON..... BUT IT'S BY COMBINING THEM ALL THAT WE CAN HAVE THE MOST IMPACTAND MAKE REAL PROGRESS TOWARDS OUR TARGETS.</p> | | | |
| TIMESCALES | ● | ● | ● ● ● | ● ● ● ● ● |
| DIFFICULTY | ● | ● ● | ● ● ● | ● ● ● ● ● |
| POTENTIAL BENEFITS | ● | ● | ● ● ● | ● ● ● ● ● |

Raising the profile

WASTE WATER SERVICES GUIDE TO CARBON

A **carbon footprint** is a measure of the impact our activities have on the environment, and on climate change. It relates to the amount of greenhouse gases produced through activities such as burning fossil fuels for electricity, heating and transportation.

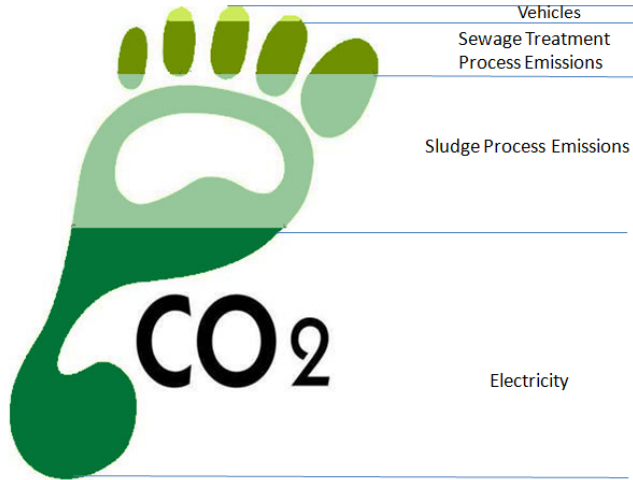
From 2011 STW will be required to pay for the carbon cost of our electricity consumption on top of buying the energy.

What does this mean for Waste Water?

Water Companies account for approximately 1% of the UK's carbon footprint



Waste Water's Operational Carbon Footprint



Operational Carbon

- Relates to carbon produced by our assets.
- E.g. By using electricity, fuel or chemicals

Embedded Carbon

- Relates to the carbon produced during construction
- E.g. In the concrete, steel etc

How is Waste Water addressing the carbon challenge?

Current forecasts tell us that waste water's carbon footprint will increase slightly over the AMP period. We would like to bring this more in line with government targets to reduce carbon.

We are only monitored on operational carbon at present, therefore our focus is on reducing operational carbon.

Carbon Currency Converter

$$1250 \text{ tonnes of carbon} = \text{Running a 50,000 pe works ASP for a year} = 2.3 \text{ GWh of electricity}$$



CRC

- The Carbon Reduction Commitment (CRC) is a mandatory emissions trading scheme that aims to reduce the amount of carbon emitted by the UK. From April 2013 Severn Trent will have to accurately estimate the amount of carbon it will use for within the financial year and will be charged for the amount of carbon used
- From April 2013, the amount of carbon allowances sold will be capped by the government and companies will be required to buy carbon allowances in auction where the price of carbon will reflect the market value.
- For waste water our CRC carbon footprint is largely energy (99%).



GHG

- Although we are not yet required to report GHG emission to the government, Ofwat require annual GHG reporting and forecasting.
- For Waste, our key contributors to GHG are electricity and process emissions from sewage treatment and sludge.
- GHG does not just include carbon. Other greenhouse gases are converted into a "carbon equivalent" depending on their effect on the environment. Methane is 25 times more potent than CO₂ and Nitrous oxide is 298 times as strong.

Waste Water Services carbon targets & aims



- Waste will aim to reduce our operational carbon footprint by 1% in each year of AMP5
- This will contribute to our company CRC targets.
- To achieve this Waste will need to reduce our energy consumption by approximately 4GWh every year of the AMP period.
- Waste will aim to have no increase in sludge emissions over the AMP
- STW will increase the accuracy of GHG accounting and forecasting

Where Do I Learn More?

you have a question regarding Severn Trent's position on carbon please contact Stephen Hill or Emma Ill in the **Energy & Carbon management team**.

you have questions regarding Waste Water's plan for addressing our carbon impact please contact **The o-solids, Energy & Carbon Strategy team** in Waste Performance & Planning.

you need help completing carbon calculations for a scheme please contact **The Waste Standards team**.

If you think you require additionally training on carbon please speak with you line manager or get in touch with the teams listed above.

But I promised you aliens...





Imagine you were a Martian looking down on Earth....

I'm a Water Resource Planner and we're struggling to meet demand...





Imagine you were a Martian looking down on

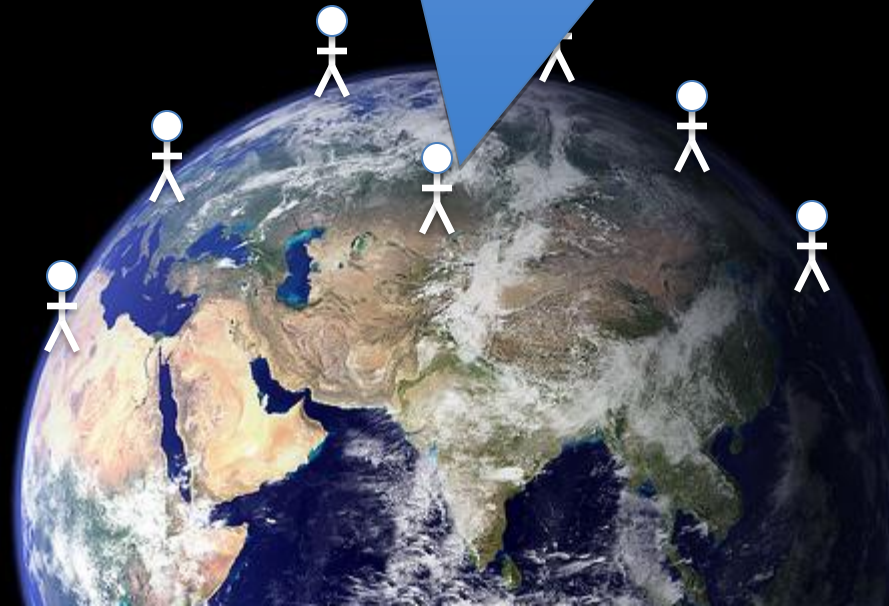
I'm the Water
Treatment worker
who treats all the
water to a *fantastic*
standard!





Imagine you are looking down on

I like to pump the water round a bit from BIG regional works





Imagine you were a Martian living on

I'm a customer and I drink about 2 litres of this water each day - but use about 150 litres more!





Imagine you were a Martian looking down on Earth....

..and did I mention that I mix it in with all sorts of nasty stuff ?





Imagine you were a Martian looking down on
Earth....

I'm a sewage
pumping station
Manager – I love
pumping sewage far
away from you...





Imagine you were a Martian
looking at Earth

I'm the Sewage
Treatment worker. I
use loads of carbon
separating it all out
again





Imagine you were a Martian
on Earth

Yip, yip...
Are you having a
laugh? Yip.



So...Some thoughts to leave you with

It rains

X

We can help mitigate climate change!

and treat water

distribute water

We use it

We add clean rain water to it

We pump that somewhere else

We treat waste water

Where to develop?

What's our role in influencing behaviour?

How to separate waste streams?

How to think local

How to collaborate in catchments

How to challenge perceived wisdom!

How to press on with SUDS

How to influence building regulations

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