British water grids and wholesale water trading

The case for examining the costs & benefits of a national water grid

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Structure of presentation

The national context
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National water resource policies: some conclusions

1. **Water is most scarce in Southern England, followed by the eastern, Thames and south west regions**

2. **60% of Water Delivered in England & Wales is still not metered in 2005 and many areas in southern Britain will have fewer than half of households metered by 2010. The government should consider changing its current (passive) water metering policy***
   - **Metering conversion is not concentrated in the areas where it is most needed**
   - **We are metering the wrong households within each region**
   - **Passive policies act too slowly to help resource shortages in southern Britain**

4. **Given population movements into southern Britain new water supplies will be needed, but**
   - **It is the driest part of the country and the Environment Agency does not want to release more water**
   - **In many areas the EA wishes to *reduce* current water abstractions to preserve river life and water tables**
   - **Water companies are examining storage schemes but these are expensive when fully costed, financially and ecologically**
   - **Desalination of estuaries or the sea is being piloted by some water companies, but**
     - This is expensive and energy-intensive
     - It only looks to be economic at absolute peak times
   - **Re-cycling treated sewage effluent would be cheaper but the idea is strongly disliked by consumers**

5. **Could water be transported to southern Britain from areas where it is not scarce?**
   - **E.g. Craig Goch and the Elan Valley in mid-Wales already collect water and could collect far more**
   - **This is *sustainable water*, collected at a height of 1000 feet in an area with more than 70" of rain a year**
   - **Yorkshire and the Peak district are also not short of water, and could easily be linked to the vast water resources of Northumbria – if a way could be found to move the water south…**

*** See OS presentation on British policy on domestic water metering: the case for a more interventionist policy**

Water grids

1. Why build a grid?
2. Current situation
3. What are the long term consequences?
4. 1999 consultants' exercise
5. Why don't water companies build these grids?

Why build a grid?

Three kinds of benefit:

Enhanced security of supply

- **Enables companies to move useful amounts of water around the UK in a drought**
- **Climate change means hotter, drier summers, so more frequent 'extreme' peaks**
- **In dry winters can use northern Britain's spare capacity to relieve the south's aquifers**
- **In summer droughts can use eastern England's aquifers & longer rivers to relieve western Britain's generally shorter rivers**

Improved environmental management

- **Can move water permanently from northern and western regions to southern ones**
- **Enables rising demand in southern England to be met from higher abstractions in unstressed regions (= sustainable consumption)**
- **Can also be used to reduce current stress on sources in southern England**

More economic?

- **Once built, companies can use grids to make trades which are mutually beneficial**
- **Estimated costs of this water can be compared with those estimated from desalination, effluent re-use, or new reservoirs in southern England**
- **Would a national grid be outrageously expensive?...**

Stylised map of regional water transmission grids in 2005 – largest diameter pipes

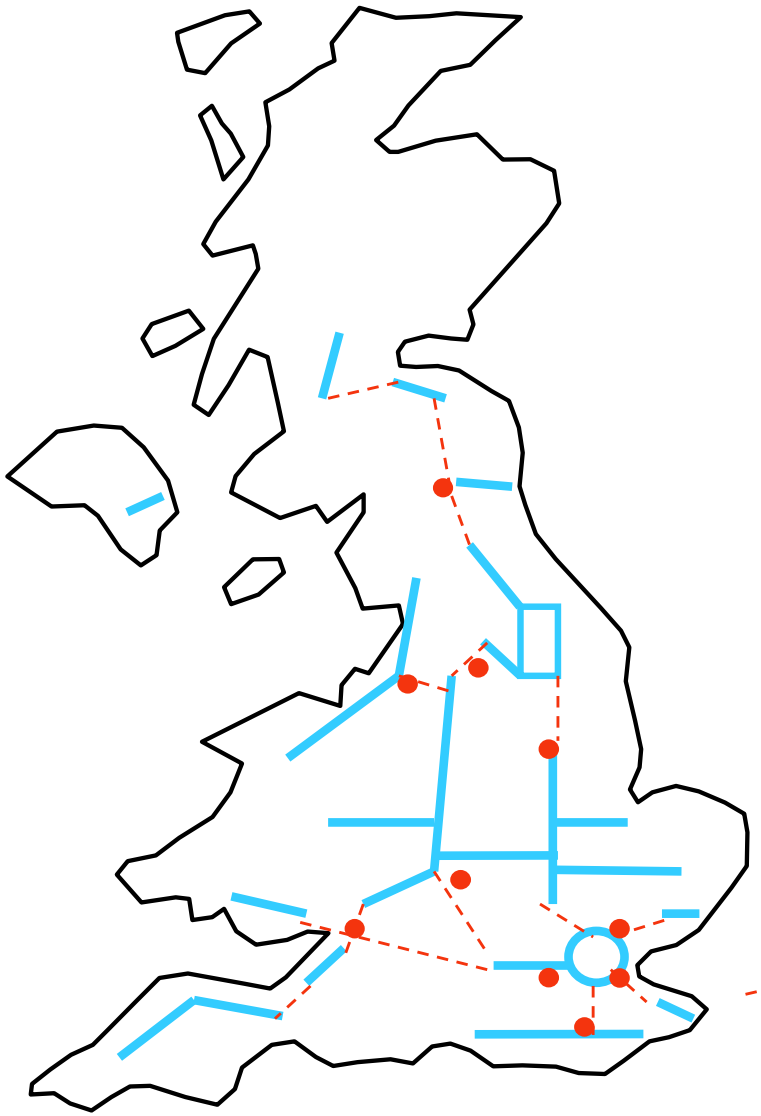
All water companies have built treated water grids to move water around their supply areas

These regional treated water grids do not link up nationally

A detailed desk exercise by water industry consultants in 1999 estimated the capital cost of linking every water company's regional grid to at least two neighbours' grids would be £100m

£100m is less than 2 weeks worth of current water industry capex spend.

What are the long term consequences?



- Genuinely new sustainable resources could be brought into southern Britain without flooding new valleys, desalinating the sea, or recycling treated sewage effluent
- Any mothballed seasonal storage capacity in northern and western Britain could be brought back into use or expanded
- Water would be moved from north and west to southern Britain using private economic incentives
- Wholesale regional water markets would emerge trading bulk water for short and long term contracts

= possible new strategic mains

= possible regional water market

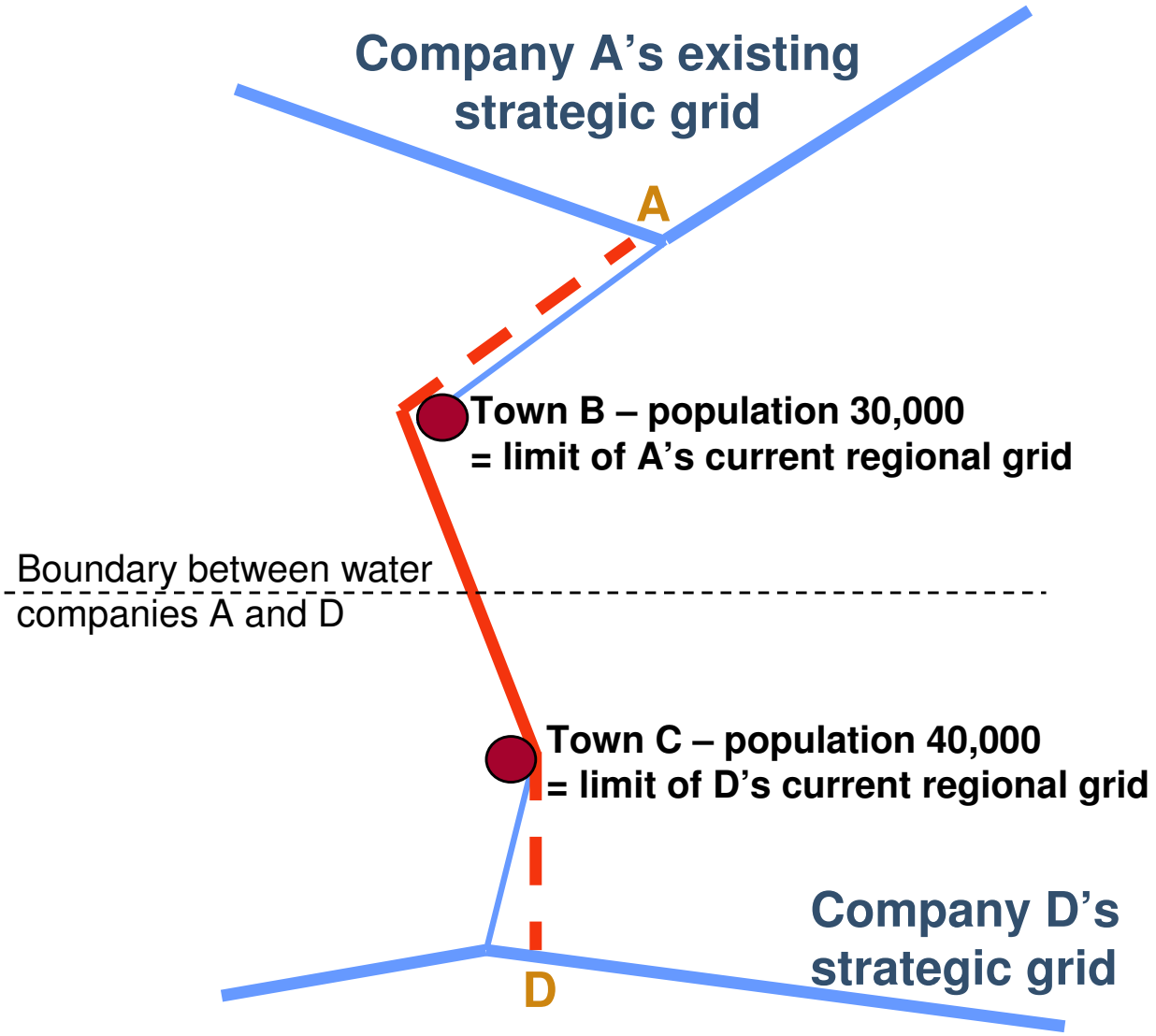
The 1999 exercise

In 1999 water industry consultants* undertook a desk study to:

- **Design a network of large mains to link every water company to at least two neighbours**
- **To cost these links using Ofwat standard unit costs for each type of main laid**
- **Each inter-company link was assumed to consist of:**
  1. **a strategic main between two towns with populations of 30,000 or more on different sides of water company boundaries**
  2. **a chamber, pump, valve, and chlorine booster at each end of the pipe**
- **Around 30 mains were assumed to be built (there were more water companies in 1999 than now)**
  - **The mains were assumed to be**
    - 600mm diameter between large water companies
    - 600mm or a few 300mm between smaller and larger water companies
- **The total cost of building 30 mains linking every water company to at least two neighbours was found to be almost £100m (in 1999 prices)**

**Source: PwC Consulting internal report by Hull, Loizou and Simon 1999*

Suggested improvements: what enhancements would need to be added to create a more effective 'national water grid'?



Consider a typical situation across the border of two water companies, A and D, each with its own regional water grid.

Blue lines represent each company's existing grid, and red the new pipes that would have to be built to link the regions.

The cost of 30 links similar to B to C was estimated nationally at c. £100m in 1999

Reinforcement costs of A to B and C to D were *not* estimated in 1999. Total costs to create such a national grid might well run to a few hundred million £s – but this could (and should) be estimated accurately in advance in a study

Why don't water companies build these links?

1. Each company focuses on its own situation: "We cannot solve the country's problems"

2. Potential water exporters say they would be happy to make small exports at present or bring forward plans to develop their next resource, but "show us the market and we'll build a link"

3. Potential importers are vertically integrated water companies who like being independent
   - Some potential importers fear that if they were more inter-linked exporting companies might steal their large industrial customers
   - Once a link is built it is there forever; other potential importers fear that if a future government were to permit domestic retail competition the exporters would steal all their domestic customers as well, so their water company would become 'just a pipe company' (just a distributor of water, not a producer and retailer of it, as at present)
   - Shareholders, company Boards and CEOs want to grow their company's permanent net worth (its Regulatory Capital Value); new resource developments add far more to their RCV than new links
   - Engineers like big engineering; they dream of building and operating major new resources, not of building another few miles of pipe

4. Economists with experience of several sectors note that there was identical resistance to vertical product trading in industries such as oil, gas, electricity and telecoms, … all wrong, all long since overcome

5. So the genuine difficulties of mixing different treated waters – which water companies daily overcome whenever they mix surface and ground waters (in business-as-usual) – may be exaggerated in public

6. Overall, co-operative behaviour is required to achieve some mutually beneficial solutions
   - i.e. someone needs to lead it

Bilateral water trading

- **Bilateral water trading**
  - **There is potential for far more water trading across Britain than currently occurs, although new 'bulk supply' (wholesale) contracts are being signed each year and old ones continue to roll on**
  - **Some potential importing companies allege that bulk supply contracts are not as reliable as new resources because the contracts permit exporters to interrupt supplies more-or-less at the exporters' discretion, leaving the importer with a major unpredictable supply risk**
  - **Evidence of such interruptions in practice is hard to find: in fact nearly all companies import or export water every day with neighbouring water companies, and some obtain more than a fifth of their net supplies as imports; *in practice* bulk supply contracts are patently relied upon and working**
  - **However, it is true that many old bulk supply contracts *in theory* permit behaviour that would be very undesirable economically**
    - They were negotiated between water engineers decades ago under completely different circumstances to those now facing water companies in southern England – before water was a truly scarce commodity
  - **These contracts need to be renegotiated onto modern reliable terms – e.g. with heavy penalty clauses for breach of contract;**
    - When the energy sector faced identical problems this approach worked very well – old contracts were completely phased out and new ones replaced them; both the gas and electricity industries have handled massive changes in demand and supply patterns over the last fifteen years without major interruptions

Water trading in wholesale markets

- **Market trading of bulk water has been examined in detail**
  - **Oxford Strategies' consultants have evaluated the scope for wholesale water market trading at selected locations around England and Wales**
  - **Preliminary feasibility studies have shown how such markets will work structurally and contractually, how they could be funded and regulated, and that they were economically viable given companies' different long run marginal costs (i.e. both importers and exporters achieved considerable commercial gains compared with a non-trading position)**
  - **More detailed feasibility studies for specific locations can be prepared – if commissioned.**

Summary conclusions

1. **Metering is the best way of monitoring water demand accurately and encouraging its efficient use, yet three fifths of drinking water sold is still unmeasured at the point of sale**

2. **National metering policy is not working fast enough to solve water scarcity problems**
   - **We are metering the wrong houses in the wrong regions**

3. **A national treated water grid could probably be built for a few hundred million pounds**
   - **An outline desk costing exercise has been done – and could be updated in a few weeks**
   - **A more detailed exercise using companies' latest information could be rapidly done – in 2-3 months**

4. **More bulk trading of treated water between companies – bilaterally and through wholesale markets – would follow the establishment of a national grid**
   - **Providing sustainable new water resources for southern England**
   - **Promoting national resource optimisation between regions, and**
   - **Permanently improving our national security of supply**

5. **The UK should examine the costs and benefits of a national water grid based on linking water companies' existing treated water grids. In an industry where consumers spend £3500m a year on tap water, and the 'consumer surplus' exceeds ten times that figure*, the benefits of constructing a national water grid could easily exceed several hundred million £s, while the cost of doing an outline exercise to assess the likely scale of costs and benefits is measured in tens of thousands of £s.**

*** See myths 3 and 8 of Oxford Strategy's 'Nine great British water myths', on the OS website**