Engineering the future of water
Water security challenges- is water transfer the answer?
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The Case for water transfer

by

Chris Binnie
MA, DIC, Hon DEng, FREng, FICE, FCIWEM
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• Demand projections
• Climate change
• Sustainability reductions
• Alternatives
  • Metering and tariffs
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• Inter-basin transfers
Freshwater abstraction by sector
Water abstraction 1995-2008
Household, and non-household demand and leakage 2000 to 2009.
Metered and unmetered pcc 2000-009.
Water company distribution input 2003-2010
Security of supply 2002-2010

Figure 4.3: Trends in security of supply for water companies with a security of supply index less than 100 (2002-2010).

Source: From data reported to Ofwat (June returns).
Notes: The security of supply index represents how likely consumers are to receive a target level of service. The target level of service relates to the frequency with which water companies are likely to impose water restrictions on users and varies between company. A score of 100 indicates that all...
Demand projections 2010-2035
Projected population growth 2006-2030
Projected distribution input 2007-2035

Projected Distribution Input for England and Wales

0 2000 4000 6000 8000 10000 12000 14000 16000 18000
Year 2007-08 2016-17 2025-26 2034-35
Source fWRMP

Mid
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
Year 2007-08 2016-17 2025-26 2034-35
Source fWRMP
Projected distribution input for South East England 2014-35

South East England Projected Distribution Input

Year | 2014-15 | 2034-35
--- | --- | ---
Ml/d | 5000 | 5200
Water resources
Areas of relative water stress

Climate change effect

Future pressures – changes in river flow

- Overall decrease in river flows
- Greatest decreases in summer and on hard rock catchments
Surface water bodies at risk from abstraction
Restoring sustainable abstraction sites
• Serious risk that sustainability reductions will reduce available supply.
Further demand reduction?

- Metering and tariffs
- Further leakage reduction
- Greater water efficiency
Further water resources
Integration and conjunctive use
Inter-company trading
Inter-company transfers

- Few recent new ones
- Greater conjunctive use
- Utilise future surpluses
- Some incentive against
- Change in regulation regime
Reuse of treated sewage effluent

- Robust to climate change
- Water quality issues
- Water Safety Plan procedure
- Langford Scheme operational
- Deephams STW studies
- Membranes
- Energy use
- Would reuse be acceptable to customers?
Effective rainfall

Figure 2a
Winter effective rainfall
(October to March)

Figure 2b
Summer effective rainfall
(April to September)
Effective rainwater utilisation
Water available for abstraction (surface water combined with groundwater)

Resource availability status:
- Water available
- No water available
- Over licensed
- Over abstracted
- Groundwater only/not assessed/no status available
Reservoir storage

- Raising existing
- New reservoirs
- High cost
- Long time to develop
- Environmental impact
- Loss of agricultural land
Inter basin transfers
Transfers

• Different water qualities and WFD “no deterioration of status.”
• Droughts less correlated.
• Energy
  • Energy recovery
  • Only pumping when needed.
  • Less pumping in earlier years
  • Decarbonisation of the electricity industry
Figure 2.1: Carbon emissions associated with the water industry and household use in England and Wales.

Water in the home – 89%

Total carbon emissions of 6.2 tonnes CO₂e per Ml water for water in the home. This equates to 2.2 kg CO₂e daily per household.

External to household – 11%

- Wastewater treatment 7%
- Water treatment 2%
- Water distribution 1.6%
- Source, abstraction and conveyance 0.4%
Conclusions

• Recent PWS demands steady
• Currently robust water resources
• Climate change
• Future Sustainability Reductions are not included
• Demand management
• Inter company trading
• Reuse
• Reservoirs
• Inter basin transfers