

Water Security: The World is Watching Australia

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Michael Norton MBE



What to and what not to mention



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This evening's presentation

- "A perfect storm is brewing"
- The challenge
- Who cares?
- What Halcrow is doing
- Why Australia is leading the way
- Personal reflections

"A perfect storm is brewing"



A perfect storm...the Water-Food-Energy nexus



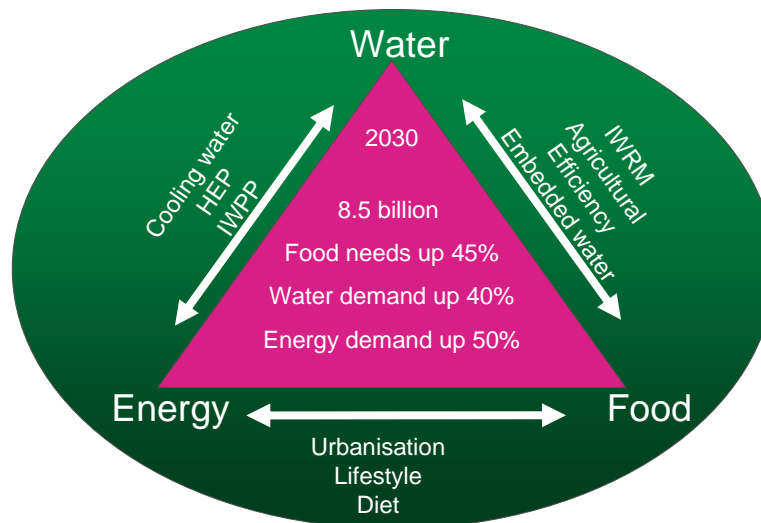
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Demands on the Water-Food-Energy nexus



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The challenge we are facing

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Our Earthso much water



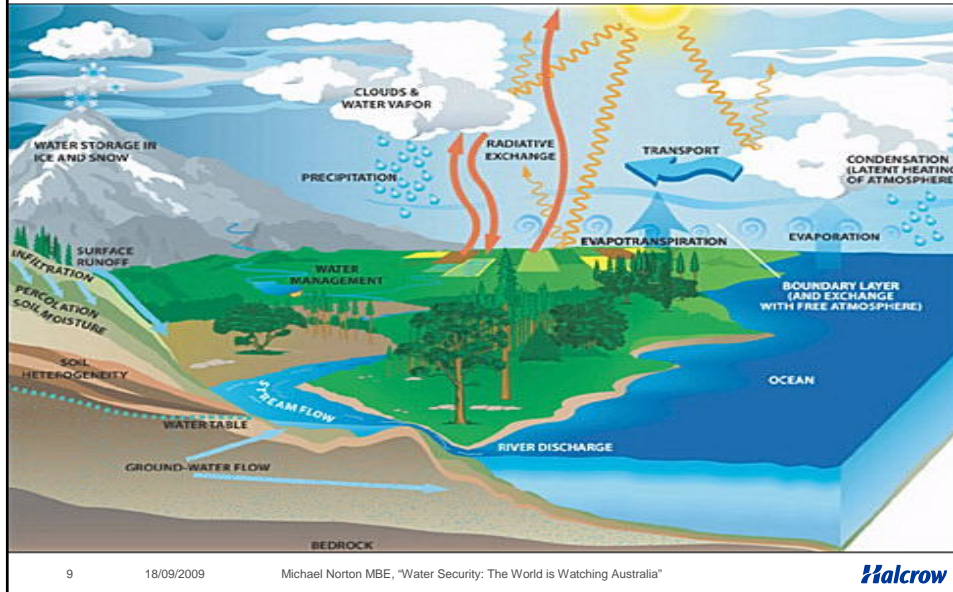
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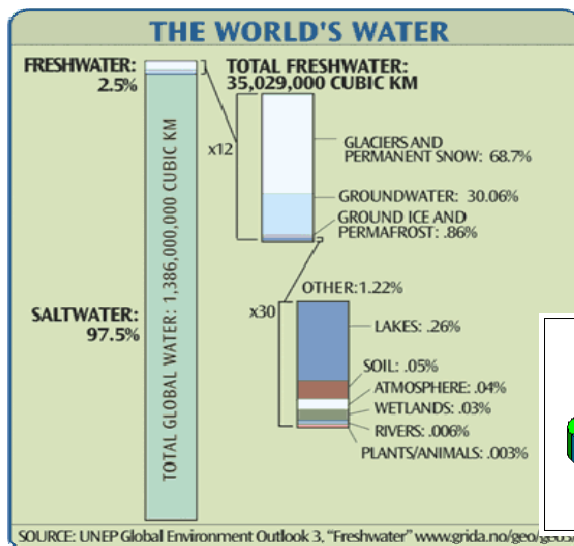
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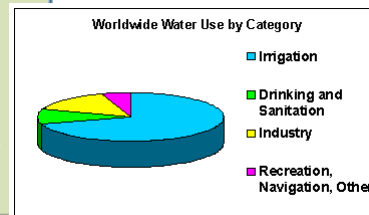
The Water Cycle



Just how much water is there?



- Rivers convey 43,000 km³ per year
- but it isn't uniformly distributed in space and time....
- and only 12,500 km³ can be accessed
- And already we withdraw 4,000 km³ ..



Scarcity is already here – an “Invisible Crisis”

- 40 per cent of the world’s population lives in countries facing water scarcity.
- Of these, 1.2 billion suffer from physical water scarcity, where there is not enough water to meet domestic, agricultural or other demands.
- A further 1.6 billion suffer from economic scarcity, where water is available but the financial resources to provide the infrastructure and institutional arrangements needed to supply it are insufficient.



The situation is getting worse.....

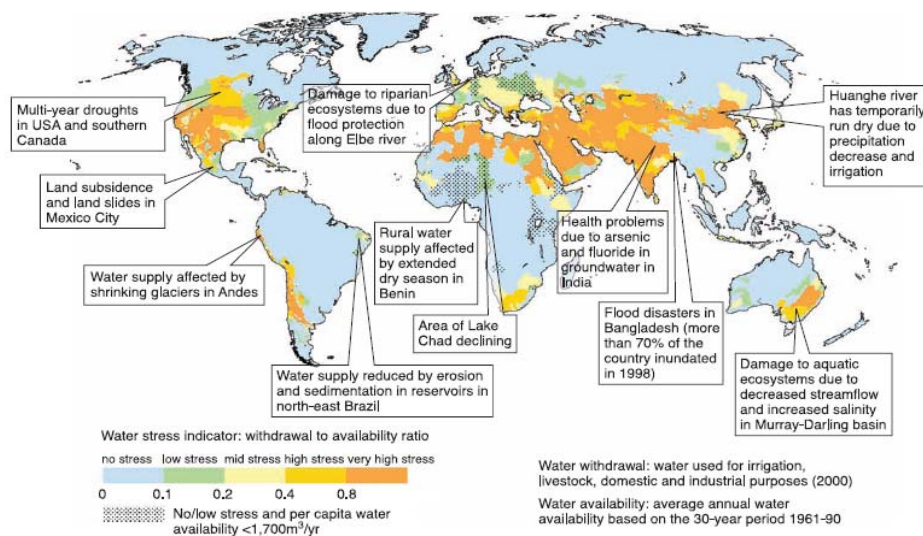
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Some vulnerabilities



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Climate Changechanging availability patterns

- Changing the number of rain days
- Changing storm intensities
- Changing geospatial distribution of precipitation
- Melting glaciers reducing natural storage



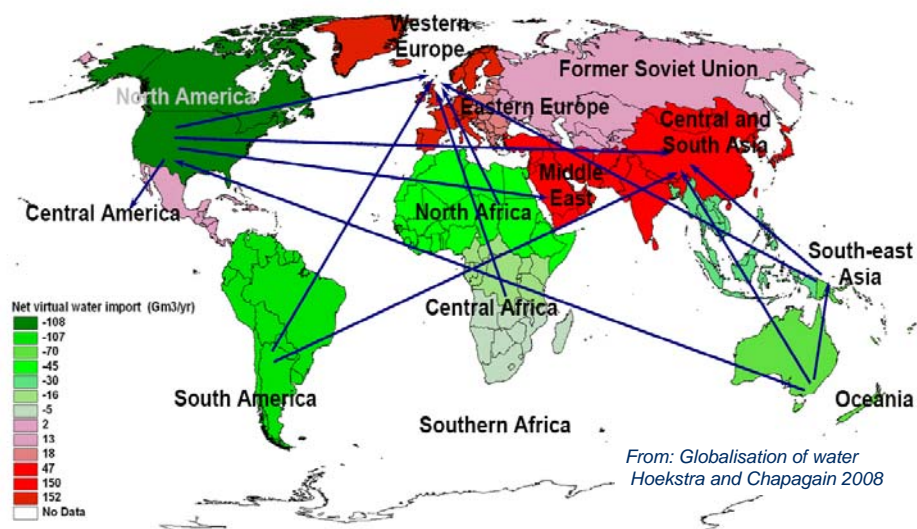
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Flows of virtual water



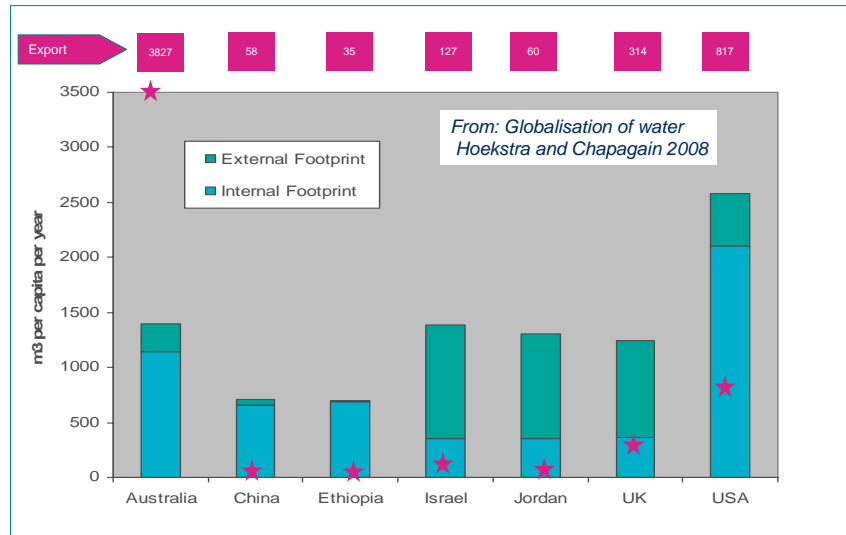
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Water footprints



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Economics and Water Scarcity

- The raw economics of water are both compelling and challenging: water security, economic development and GDP are interlinked.
- Business and capital will be attracted to those economies in water-scarce regions with sound water management.
- New technologies, new markets and new financing ideas will be attracted to solving the water challenge.
- Water will become a mainstream theme for investors.
- Governments in water-scarce regions that undertake water reforms will strengthen and position their economies well.
- Global financial regulators will have to develop clear rules to manage the inevitable appearance of innovative water funds.

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Water Security - Act NOW

“The challenges are great,
but unsustainable management
and inequitable access to water
resources cannot continue.....



.....Actions must include
increased investment in water infrastructure and
capacity development.....

.....leaders in government, the private sector and
civil society.....must ACT NOW!”

United Nations World Development Report 3, March 2009

Who cares?

Who is managing the crisis?

- There is no coordinated global management authority for water in the world at large.
- The necessary action must be, and is being, led by:
 - global influencers
 - politicians
 - in-country and global water experts
 - the business community around the world
 - civil society in the water community.



Global Actions for World Water Security

- Protect and improve **affordable drinking water supplies** to urban and rural populations
- Provide **businesses with sufficient sustainable sources of water** for production purposes, including security of water for the suppliers of raw materials.
- Improve the **management of water in all its uses**, especially for the biggest user of water worldwide - agriculture
- Provide the **policy reforms** that will lead to sustainable water resources development, thus preventing political instability and at its extreme, water wars.
- Mobilise sources of **substantial volumes of public and private funding** into water management, through the provision of regulatory regimes which give investors confidence.

Millennium Development Goal 7

Target 10: Halve, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation

What does this mean in Developing Regions?

<u>If MDG Target 10 Achieved:</u>		
Nr people without sustainable access to drinking water		
	2000	1033 million
	2015	847 million
Reduction		186 million
<u>If performance remains same as 2000-2006:</u>		
Nr people without sustainable access to drinking water		
	2000	1033 million
	2015	847 million
Reduction		186 million
Nr people without sustainable access to sanitation		
	2000	2509 million
	2015	2555 million
Reduction		-46 million

Global Influencers

- UN-Water, an inter-agency mechanism formally established in 2003, focuses on:
 - Providing information for policymakers and managers who work directly with water issues
 - Building the knowledge base on water issues
 - Providing a platform to identify challenges in global water management, analyse options for meeting these challenges and ensuring that reliable information and sound analysis informs the global policy debate on water.
- The **Global Water Partnership (GWP)**, with its vision for "a water secure world" and its mission to "support the sustainable development and management of water resources at all levels"
 - Has built up a network of regional and country partnerships to bring various sectors and interest groups together
 - To identify and discuss their common water problems
 - To develop action plans based on Integrated Water Resources Management (IWRM).



Global Influencers

- The World Economic Forum
 - Aims to be:
 - The foremost organization which builds and energizes leading global communities
 - The creative force shaping global, regional and industry strategies
 - The catalyst of choice for its communities when undertaking global initiatives to improve the state the world.
 - The Forum has launched its **Water Initiative** to promote a global dialogue on water - recognizing that there is still a major challenge in catalysing more streamlined and effective action on a global level.
- The Worldwide Fund for Nature
 - The largest multinational conservation organisation in the world.
 - A non-profit organisation whose mission includes promoting sustainable approaches to the use of renewable natural resources.
 - Committed to turning the world freshwater crisis around before it is too late.

Global Influencers

- The World Water Council
 - An international multi-stakeholder platform established in 1996 in response to an increasing concern about world water issues from the global community.
 - Mission is "to promote awareness, build political commitment and trigger action on critical water issues at all levels, including the highest decision-making level, to facilitate the efficient conservation, protection, development, planning, management and use of water in all its dimensions on an environmentally sustainable basis for the benefit of all life on earth."
 - Encourage debates and exchanges of experience: aims to reach a common strategic vision on water resources and water services management amongst all stakeholders in the water community.
 - Every 3 years organises the World Water Forum

What Halcrow is doing

What is Halcrow doingand why

Our core purpose mission "sustaining and maintaining the quality of people's lives"

- Engagement in the global debate e.g. through World Economic Forum and World Water Council
- Signing up to the UN Global Compact and CEO's Water Mandate
- Partner in WSUP, a non-profit organisation improving water and sanitation for the urban poor
- Partnered with Halcrow Foundation to help people in need around the world
- Developed Water Security Institute with a leadership team and a global network of experts
- Undertaking projects that improve Water Security around the globe

Halcrow Vision for Water Security

- A water security business that serves government, NGOs, agri-business and industry by resolving the supply demand imbalance through advice and design
- Operated by key specialists on behalf of Halcrow
- In order to *sustain and improve the quality of people's lives* in a highly visible way
- Within a rapidly changing and uncertain global, political and environmental climate

River basin studies

- Planning
- Catchment management
- Institutional development
- Economic, social and environmental impact
- Integrated water resource management

Water advisory services

- Water audit
- Water economics
- Water trading
- Transactional advice
- Demand management
- Decision support

Agricultural efficiency

- Economics
- Efficiency of irrigation
- Social issues

Industrial water efficiency

- Business case
- Efficiency
- CSR

Water resource infrastructure

- Dams and reservoirs
- Transfer pipelines and aqueducts
- Asset management

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Key Halcrow Water Security Experts



Richard Harpin, Water Security Director. Water resources planning, river basin studies, hydrology



Jon Bateman, Regulation, water utility operation and planning, water sector policy and reform advice



Jon Wicks, Decision support systems, modelling software



Rodolfo Aradas, Chief Engineer hydraulic modelling, river basin planning, water resources planning



Malcolm Wallace, Agronomy and agriculture, land and water resource development and strategic planning



David Best, Membranes/ desalination



Steve Paley Agronomy & agriculture



Stuart Suter, River basin planning, irrigation



Peter Von Lany, Risk management, river basin planning, decision support,



Katherine Pygott, Chief Scientist Catchment processes, water quality, river basin planning, water level management



Sajid Hussain, Regulatory economics, financial appraisal



Lauren Mittiga, Regulation, water resources planning, water system modelling, hydrology, drought planning.



Patrick Hawker, Water resources planning and engineering, irrigation



Joe Wood, socio-economic profiles, poverty assessments, social impacts of development projects and strategies



Elliot Gill, Rainwater harvesting, Strategy and planning, water cycle studies, sustainable urban design



Allen Warren, Chief Engineer Dams and embankments



Phil Hughes, Water and sustainability strategy and assessment, sustainability reporting, economic and policy analysis.



Kunle Akande, Water resources planning, water system modelling, groundwater modelling

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Key Halcrow Water Security Experts



Nick Pursell, Water treatment/ re-use



Richard Shackleton, Water supply design management



Mark Queded, Ultra filtrated water, leakage and waste control.



Jim Ellis, regulation, project management, construction and operational management of water resource and irrigation projects



Michael Norton, water and sanitation, waste water treatment



Martin Smith, Water & Wastewater strategy and planning



David Francis, Regulatory compliance



Zhengfou Rao, Optimisation of water systems



Graham Hindley, regulation, Approved Certifier and auditor



Mark Browning, Corporate Responsibility and sustainable development.



Jim Sly, Strategy and planning, regulatory compliance, water supply design & management



Sue West, demand management.



Richard Ashby-Crane, integrated river basin management, river restoration/wetland management and freshwater ecology



Mic Yaxley, development planning, master planning



David Birch, 30 years experience in water resources management, planning and strategy, flood protection, irrigation, and rural development projects.

Mekong Water Utilisation Project

- A decision support system was built comprising:
 - Hydrologic, hydraulic and water allocation models
 - A knowledge base comprising base data, intermediate and final model results
 - Impact analysis tools to determine the impact of development on social costs and the environment
 - A GIS-based user interface to the system
- Used for simulating flood and drought
- Based on user-defined development scenarios
- Used for river basin planning by the Mekong River Commission and the 4 countries in the Lower Mekong Basin
- Capacity building and training of staff



Blue Nile Irrigation Project, Ethiopia

- Feasibility studies for 80,000 ha of irrigation and drainage projects
- Forms part of Nile Basin Initiative to promote equitable use of the water resources of the Nile Basin
- Three schemes:
 1. Megech, pumping water from Lake Tana
 2. Upper Beles, diverting river flows - enhanced by transfers from Lake Tana
 3. Negesso valley, to be irrigated from a dam and reservoir
- Long-term goals of the study include:
 - involvement of private sector
 - food security through increased crop production
 - reduced poverty
 - economic activities providing the opportunities to grow high value crops
 - rural employment, wealth and well-being



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WSUP in Maputo, Mozambique

Halcrow is a member of Water & Sanitation for the Urban Poor (WSUP), a not for profit organisation and has provided significant inputs into this project. The work includes important elements in:

- expanding tertiary water supply networks in shanty towns around the city in coordination with the asset owner (FIPAG)
- improving basic sanitation (latreans and sanitation blocks) in coordination with the Municipal Council
- building capacity in user's associations, water and sanitation SIPPs and water concession companies including unaccounted for water
- supporting the national regulator (CRA) on channelling the consumer's voice and testing alternatives for management of bulk water sellers
- developing Pro-Poor Public-Private Partnership



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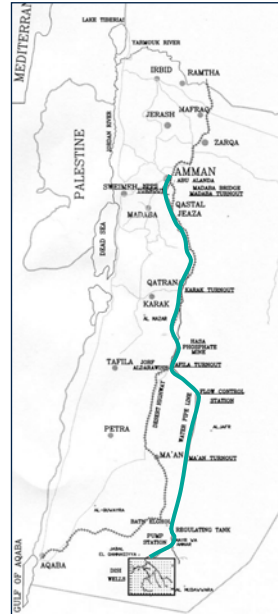
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Disi-Mudawarra to Amman Water Conveyance Project, Jordan

- Jordan is considered one of the ten most water-scarce countries in the world
- City residents are subject to severe water restrictions.
- High population growth and depletion of groundwater reserves are threatening to aggravate this situation in the future
- Project involves construction of a 325km pipeline that will drive water from the Disi-Mudawarra aquifer on the Jordan-Saudi Arabia border to Amman,
- Project includes
 - 55 production wells,
 - 120km of collection piping,
 - 325km of conveyance piping,
 - 2 pumping stations,
 - four tanks
 - one reservoir



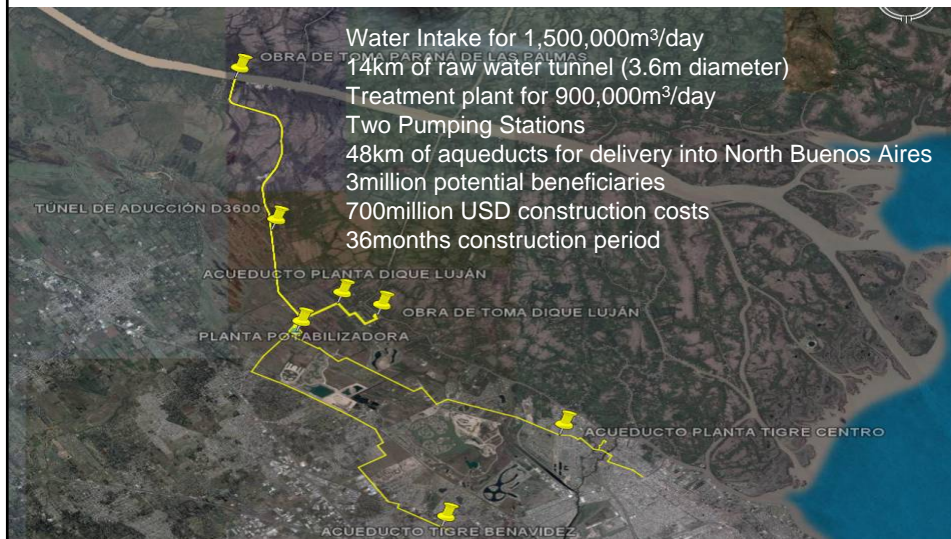
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Tigre Water Supply, Buenos Aires



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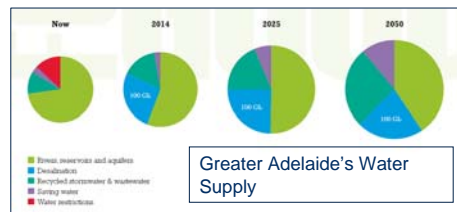
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Why Australia is leading the way

Australia – Leading the Way

- An exemplar in Integrated Water Resources Management.
- South Australia’s Water Security Plan - Water for Good
- The 4 “Water for the Future” priorities:
 - Taking action on climate change
 - Using water wisely
 - Securing new water supplies
 - Healthy rivers
- Experiences in Murray Darling Basin
- At the forefront of Water rights and Water trading
- Desalination using renewable energy
- Water sensitive urban design (WSUD)



Australia – Leading the Way

- National Water Initiative and Intergovernmental Agreement on Murray-Darling Basin Reform
 - Obvious success in establishing intergovernmental agreements
 - But how to achieve significant progress, and maintain cross-jurisdictional funding and support?
- “Water for the Future” National Plan
 - New national plan investing \$12.9 billion over ten years to address four priorities:
 1. Taking action on climate change
 2. Using water wisely
 3. Securing new water supplies
 4. Healthy rivers

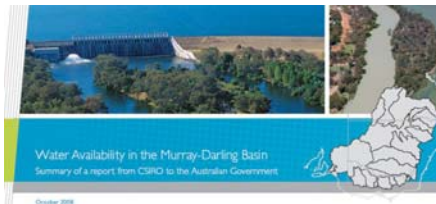


Australia – Leading the Way

- A new Murray-Darling Basin Plan in 2011
 - The Basin Plan will be based on the best and latest scientific, social, cultural and economic knowledge, evidence and analysis

“Australia is entering a new era in water management and environmental protection. For the first time, the surface water, groundwater and environmental resources of the national heartland, the Murray-Darling Basin, will be managed as a whole, according to a single, legally enforceable plan – the Basin Plan. This is planning at a scale and complexity that has never been undertaken anywhere else in the world.” (Murray Darling Basin Authority)

- The Murray-Darling Basin Sustainable Yields Project
 - Completed in late 2008, CSIRO undertook “the world’s largest basin-scale investigation of the impacts on water resources of:
 - catchment development
 - changing groundwater extraction
 - climate variability
 - climate change.”



Australia – Leading the Way

- Water entitlements and water trading
 - Innovative and world leading design of water markets and entitlements
 - Importance of water accounting, and problems of over allocation
- Management of environmental flows
 - Australia is establishing new agencies with new roles - Commonwealth Environment Water Holder and environment water managers to buyback water entitlements for the environment



Australia – Leading the Way

- Desalination to safeguard water supply
 - New desalination plants for most major Australian cities - powered by renewable energy
 - Non-rainfall dependent water supply but how best to minimise impacts and overall carbon footprint - potential for low carbon desalination?
- Third party access to water infrastructure
 - Emerging regulatory frameworks
 - Lessons from the UK?
- Groundwater
 - Comprehensive \$82 million National Groundwater Action Plan initiated by the National Water Commission in 2007 is investing in projects to improve knowledge and understanding of groundwater

Some personal reflections

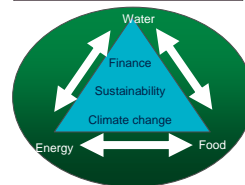
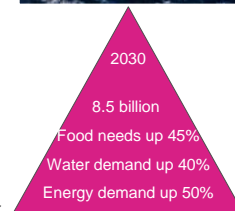
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What must be done to “make things happen”

- The global debate must be intensified
- The water-food-energy nexus needs to be better understood
- The developed world must learn from Australia
- The levers which will close the supply-demand gap need to be better understood
- Government, private sector and communities need to harmonise their aspirations through innovative partnerships
- We need correlation of countries hydrologically best suited to grow food for 9bn people
- And to do that trade barriers, price supports and other subsidies need to be addressed
- Engineers must stand up and be counted - we hold the knowledge and tools
- We must avert the perfect storm



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