[youtube:www.youtube.com/watch?v=PG79lmDD5v8]**Future Water. Keynote for Suez Environmental** . Multi-language audience (slower pace than in America)

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Lack of water is the greatest chalenge facing humankind in many parts of the world. More than a billion lack access to clean water, 2.3 billion already live in areas where there are water shortages, and 3.5 billion will probably live in water-deprived areas by 2025.

Water management will be one of the fastest growing global industries over the next 20-30 years, as developed nations overhaul old infrastructure, and emerging nations build massive new water systems.

Expect huge investment in a wide range of water-saving innovations, as well as rapid growth in trade of Virtual Water - see below.

1000 cubic metres of water per person per year - worldwide

An average person in the world uses 1,000 cubic metres a year for growing food, hygiene and drinking – equivalent to 40% of an Olympic swimming pool. Yet 4,000 children die every day because the water supply is unclean and 40% of the world do not have access to tap water – even though many of them own a mobile phone.

[youtube:http://www.youtube.com/watch?v=0fob4lal4Ro]

If the poorest nations gain a standard of living equivalent to wealthy nations today, then water demand will be three times the figure of 3,350 cubic kilometres seen in 2000.

The average US citizen uses in the region of 260 litres a day. In Europe the figure is around 150 litres: 33% personal hygiene, 33% flushing toilets, 13% is for washing clothes, 8% for washing dishes.

Some is easy to save: running a tap while brushing your teeth wastes 5 litres a minute.

America could save 850 million litres a year if people turned their taps off when brushing teeth. That means less need to replace leaking pipes, less need to build new reservoirs, less need for desalination, less energy used to pump, process or treat water.

Water in food and products - virtual water trading

150-260 litres a day figure jumps to 4,645 litres or 4.6 tons per person, in developed nations, when we take account of all the water to make the food we eat and the products we buy.

- Tomato 13 litres
- Slice of bread 50 litres
- Orange 58 litres
- Egg 146 litres
- Pint beer 170 litres
- Burger 2,400 litres

- Cotton ball 4.5 litres
- Sheet of paper 13.6 litres
- Cotton teashirt 4,000 litres
- Leather shoes 9,600 litres
- Pair of jeans 11,000 litres

Much of this “virtual water” in your shopping bag is from other nations, because the products were made there, or grown there.

So, for example, dry nations are effectively importing water when they import grain or cotton textiles or leather goods.

Over 800 billion cubic metres of water is traded virtually around the world every year.

It takes 1,000 litres to grow 1kg of wheat, so a single 40kg bag of wheat uses up the same amount of water as that carried on a 40 ton water tanker.

Importing a single 40 ton trucks of wheat is the equivalent of importing 2,500 trucks of water - enough to fill four medium-sized containers ships.

Spending on water improvements

Booz Allen Hamilton estimates that to provide enough water for all uses by 2030 the world will need to invest $1 trillion on water conservation, maintaining and replacing infrastructure and building sewage works.

In low income countries, the best investments are usually to capture more rainwater in reservoirs, ponds, lakes and dams as well as in pumping stations, boreholes, roof collection and so on.

Water investment also stimulates the economy which is why $11.8 billion was included in US Federal Stimulus packages to upgrade water systems. A further $9.4 billion is being planned by the State of California alone.

Water is too cheap in most nations

[youtube:http://www.youtube.com/watch?v=31T3do2h2DM]Water is priced far too cheap in

many nations to encourage saving, or serious investment. Water companies often lack a strong financial incentive to save billions of gallons lost each year through leaking pipes, because it may cost less to find more water in other ways.

In most nations, water has no real price for domestic consumers, because they enjoy unlimited use for a fixed price. And as every economist knows, whatever is free in any society tends to be wasted until it has to be rationed, which is exactly what is happening with water.

Many farmers in places like California have fixed water allowances each year and have no motivation to use less than their quota. This is madness in a State which has such low rainfall. In parts of Australia a market has developed, allowing such unused quotas to be bought and sold, so efficient farmers can make extra income out of conserving water.

Innovations to save water

Huge savings can be made in most nations without great difficulty. Americans already use 20% less water per person than a decade ago. Expect dramatic improvements in water use by manufacturers. A ton of steel made today requires only 2% of the water it did in the 1940s.

Smart metering for water is one way to reduce demand, with pricing that varies on the local situation. Companies like Elster and Sensus are investing into this, while

IBM is installing a smart water grid to monitor use in every household in Malta.

Sustainable water use

- Collection – roofs, roads, rivers and streams, contoured farmland, ditches and ponds
- Long term storage – underground aquifers, new dams and lakes
- Distribution – repair leaky pipes
- Metering in homes, offices and factories
- Farming – drought resistant crops, drip irrigation
- Industry –innovations in manufacturing
- Domestic water-saving devices - washing machines, washing up machines, taps and showerheads which aerate water
- Clothes - which can be cleaned with minimal or no water – nanotech coatings

- Recycling “grey water” rather than dumping into sewers – output from sewage treatment plants goes direct to water treatment plants or used for irrigation or flushing toilets.
- Grey water systems in homes and offices re-use water to flush toilets or for irrigation / watering garden
- Male urinals - no water to flush. Nanotech coating prevents adherence of toxic waste, sprayed every couple of hours
- Desalination – lower energy methods

Extract / adapted from SustainAgility book .