

WaterFront

A NEW WAVE OF INNOVATION – SMART WATER GRID, DATA DRIVEN TECHNOLOGIES,
PROCESS AUTOMATION AND CONTROL
THE VALUE OF WATER, WATER FOOTPRINT, WATER SECURITY

We can no longer waste water like Romans

POSTED BY [NOAHMORGENSTERN](#) · FEBRUARY 9, 2012 · [6 COMMENTS](#)

FILED UNDER [DAVID ZETLAND](#), [LEAK DETECTION](#), [LEAKAGE REDUCTION](#), [NON-REVENUE WATER](#), [WATER PRICING](#), [WATER SCARCITY](#), [WATER STRESS](#)

I am happy to present fellow blogger and author, David Zetland, of the [Aguanomics](#) blog and *[The End of Abundance: economic solutions to water scarcity](#)*. This week David agreed to lend his expertise to the community on the topics of water pricing, reducing Non-Revenue Water (NRW) and incentives to induce change. I hope you enjoy, and please check out his blog for more great insights.

Here we go...

Around the world, urban water suppliers use similar technology: the pipes, pumps and valves that move water from central treatment plants to household taps. These pressurized systems are not that much different from the systems that Romans used to supply water to their fountains and baths, with one exception: the Romans left their water running all day and all night. Few of us leave our taps open these days, because water is increasingly scarce — and we don't want to pay a huge bill for massive volumes of water flowing through our household meter.

But that doesn't mean that taps aren't open somewhere else in the system that serves our houses. Leaking pipes drain our water supplies all day and all night. They reduce the water we have for emergency situations, and they increase the bills for everyone who has to pay for water. Water prices are set to cover the total cost of treating and distributing water, even if half that water is lost to leaks.

The industry uses the term “non revenue water” (NRW) to refer to water that's lost, stolen or not paid for. System losses are usually the largest component of NRW that ranges from 5 percent in a “tight” system to 60 percent or more in decaying systems with poor management of revenue and water flows.

Most water managers know their NRW statistics. Some of them act to reduce NRW — by plugging leaks, metering all users and collecting payment — because they want to run an efficient operation, but others don't care: why work harder if they can just push more water through the system? That response is not very satisfactory to customers who have to bear an unfair share of the system costs; it's even less popular to people who worry about the impact of greater water withdrawals from the environment.

Indifferent managers usually pay more attention to NRW when their supplies are limited or when water is expensive. Scarce supplies make it profitable to spend money plugging leaks, to avoid building a desalination plant, for example. Higher prices create three impacts. First, paying consumers use even less water, increasing the impact of NRW (30 units of NRW in total sales of 100 units gets more important if paying consumers lower their use from 70 to 50 units). Second, higher prices mean it's worth spending more to reduce NRW. Third, higher prices mean paying customers put more pressure on managers to share system costs more widely.

There are many ways to reduce NRW. Some of them require better measurement tools; others require changes in operating techniques. It's interesting that expensive water gives both consumers and managers the incentive to change their technologies and techniques, as each group seeks a way to reduce, respectively, the cost of their household water and system inefficiencies.

Bottom Line: The end of abundant water means that cannot just run the taps like Romans. We need to close the taps, plug the leaks and make sure that everyone pays for his water use.

About noahmorgenstern

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Discussion

6 thoughts on “We can no longer waste water like Romans”

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Thanks David, for your contribution in this area, which is one of growing importance!

POSTED BY **JOHN B COOK** | FEBRUARY 9, 2012, 11:29 AM
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In defence of the Romans, I should point out that they did use taps in those houses rich enough to afford a direct supply connection. I visited Pompeii some years ago and marvelled at the excavated garden of a villa that still had in place the lead irrigation piping that had once watered the impressive walled garden. The piping was completely flattened by the tons of ash that had been deposited, but the bronze stopcock looked as if it would still work.

Most Romans had to rely on public fountains and public baths, which were generally fed by gravity (usually from sources miles away) because Romans didn't have the technology to pump large volumes of water. Nor did they master production of large diameter pressure pipes, so the water was usually transported in bulk along open channels. The initial capital costs must have been high, but the running costs very low, so once the system was developed, the water was essentially free, which was good news for the majority of citizens who were poor .

The Romans knew their civilisation depended on water supply, so they made sure the water was there to give to both the rich patricians and poor servile masses. It's not much different today in developing countries whose governments heavily subsidise water supplies, either because they don't want people dying of thirst or drinking polluted water, or, more likely, they fear riots and revolutions toppling the governments because few people can afford to buy the stuff.

I'm afraid it's not a simple matter of increasing the price paid for water.

POSTED BY **ALAN BLAND** | FEBRUARY 10, 2012, 10:02 AM

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@Alan — I agree with your Roman comments, but not with your last comment on the "value" of cheap water. I am not sure you see how cheap water both reduces system reliability and separates the water company from its "customers" (its REAL customer being the source of subsidies). The losers from "cheap water" get no water at all, and they pay FAR MORE than they would from a reliable system, in time and money spent getting water from information vendors.

POSTED BY **DAVID ZETLAND** | FEBRUARY 10, 2012, 5:27 PM

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Hi David, Thanks for the comment. Actually I'm not arguing that prices should be kept low by not investing in reliability, and I don't disagree with the proposition in the blog that a higher cost of the raw material would provide incentives for greater leakage control etc. What I am saying is that these are secondary to the bigger problems of water supply faced by the world, which are social, political and institutional.

Note that I didn't include the word technical. I get a bit tired of hearing how the world is short of water and we all have to conserve it by using less. Actually, two thirds of the planet is covered by water, and all you have to do is take the salt out of it. This is a problem that has already been solved in more than one way. I do accept, of course, that coastal desalination plants are not much use to settlements located well inland because of the costs of transport, but then it becomes a matter of recycling and re-circulating. Technically, there are no unsolvable problems in this.

The big problems of water supply arise from social changes, such as the migration from rural areas into cities that is taking pace in developing countries, placing enormous strain on resources and limited infrastructure. Then there is the problem of financing improved infrastructure, including water supplies. Many countries want to subsidise this investment, for the reasons I gave, but lack the capital to do so. You argue – and I agree – that it costs less to fund piped water supplies than water sellers charge city-dwellers for tanker-delivered supplies, so you would think that governments would accept the idea of less subsidy and more direct payment by consumers. But the benefits are long term and the risks are short term. No politician wants to place his job at risk and allow his successor to claim the credit.

What we need is an institutional arrangement that makes governments happy, defeats the vested interest of the street water sellers, circumvents corruption (oh yes, I forgot to say this is also a big problem in developing countries), results in lots of investment and gives the poor people of the world affordable water supplies. Any ideas?

POSTED BY ALAN BLAND | [FEBRUARY 12, 2012, 8:36 AM](#)

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Last summer in Houston I read that, due to the extended drought, the soil around pipes was receding, causing an erosion of support for the pipes themselves. The Houston water dept reportedly gets 300 calls a day under "normal" conditions to fix broken pipes etc, but the drought pushed that to 700+ calls a day, an impossible task for their available manpower to

address. Does this suggest that once a downward spiral begins, (dry soil, broken infrastructure etc) that the NRW goes up, water supplies dwindle much more rapidly, and the whole things goes to hell?

That's the conclusion I drew, and then I began to consider, "what areas of the country/world will be less affected by drought caused by climate change? The sociology of climate change is fascinating, in that people will leave arid areas and move to wetter ones, and the ones left behind (Waterworld) will live in societies that are increasingly violent as people fight for the water that's left.

I realize I might be exaggerating a bit, but water "haves and have nots" inside a country like the US, has a very significant "ripple effect" (couldn't resist the pun).

POSTED BY **MK (VIA DZ)** | FEBRUARY 14, 2012, 11:09 AM

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@Alan — I agree, and I cover those topics in my book (<http://endofabundance.com/>). The solutions to political barriers are (1) hope for better politicians (ha!), (2) decentralize water management (more pressure from customers), or (3) competition for customers (many creative ways to do that). Check out my book — you can d/1 the first 2 chapters for free 😊

POSTED BY **DAVID ZETLAND** | FEBRUARY 14, 2012, 11:11 AM

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