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Israel bans fluoridation of water supplies

Israel's Supreme Court has ruled that new regulations will not only end mandatory fluoridation in the country in 2014, but will also end all fluoridation, whether mandatory or voluntary.

The anti-fluoridation Fluoride Action Network (FAN) last year petitioned the court to demand that the Ministry of Health cease fluoridation because of

its claimed health dangers.

Israel is one of the few countries where fluoridation was mandated, via a 1974 regulation permitting fluoridation and a subsequent decision to make it mandatory in 1998. In April 2013 the health minister promulgated a new regulation that removed that mandate.

FAN executive director Dr Paul Connett

said: 'Fluoridation is an outdated, unscientific, failed public health blunder. What I find remarkable here is that health minister [Yael] German has been able to escape the unscientific belief system on fluoridation that traps so many public health bureaucracies in fluoridated countries.' ● **LS**
See *Analysis*, p6

EU wastewater report shows improvements

The EU has released a report on progress in meeting the Urban Waste Water Treatment Directive to 2010 that shows improvements in both collection and treatment, albeit with major differences between member states.

Front runners such as Austria, Germany and The Netherlands largely meet EU minimum standards for wastewater treatment, the report reveals, with several other countries very close behind.

Newer member states, having started from a lower baseline, have also improved overall collection and treatment despite lower compliance rates. Progress has been achieved with significant support from EU investment, amounting to

€14.3 billion (\$18.9 billion) between 2007 and 2013.

The report also notes that better water treatment and fewer raw sewage discharges into the environment have also undoubtedly improved bathing water quality – in the early 1990s just 60% of bathing sites had excellent water quality, but the figure today is 78%.

The main findings of the report show that collection rates are at a very high level, with 15 member states collecting 100% of their total polluting load. Compliance rates remain below 30% in Bulgaria, Cyprus, Estonia, Latvia and Slovenia.

Compliance rates for secondary treatment are 82%, up four points since

the last report. However, there were huge differences between the so-called EU-15, where rates were from 90 to 100% and the EU-12, more recent accession countries, where average compliance was 39%.

Compliance rates for more stringent treatment to reduce eutrophication or bacteriological pollution that could affect human health were 77% overall. Austria, Germany, Greece and Finland reached 100% compliance, whereas the EU-12 member states averaged 14%.

The amount of EU territory designated as a sensitive area increased two points to nearly 75%, with the biggest increases in France and Greece. ● **LS** See *Analysis*, p7

Councillor warns Montreal's water infrastructure plans far behind schedule

A Montreal councillor has warned that a CAN\$1.3 billion (\$1.24 billion) plan to resolve the city's water infrastructure issues is considerably behind schedule.

Finance committee member Véronique Fournier is reported as saying: 'We're on the tip of an iceberg. This project is not being managed with efficiency... and needs a major shift in how to proceed if these goals are going to be reached. In the meantime, the state of our

infrastructure is getting worse.'

A 20-year plan was implemented in 2002, but Ms Fournier warned that just 20% of the work has been undertaken.

Montreal's water infrastructure problems are well-documented, and include a recent large crater in the middle of Guy and Ste-Catherine streets that swallowed a backhoe loader. The causes include a lack of funding and the reportedly slow approval rates of both contractors and

Autorité des marchés financiers, who vet and regulate bidders and approve successful candidates.

Executive committee member Richard Deschamps spoke to the press at the Guy street – Ste-Catherine street crater, noting that 'we're working as fast as we can. We want to give [the streets] back to the people as soon as possible, but there is still work to be done'. ● **LS**
See *Analysis*, p6

Great Lake cities invited to apply for green infrastructure funding

The US EPA has invited the 22 largest US Great Lakes shoreline cities to apply for Great Lakes Restoration Initiative funding for green infrastructure projects to improve the lakes' water quality.

Cities with populations greater than 500,000 can apply for up to \$1 million. Those with populations from 100,000 to 499,999 can apply for up to \$500,000, and those with populations from 50,000 to

99,999 can apply for up to \$250,000.

The grants can be used to cover up to 50% of the cost of rain gardens, green roofs, bio-swales, porous pavement, greenways, constructed wetlands, stormwater tree trenches and other green infrastructure measures on public property.

Cities are encouraged to work with NGOs and private sector partners on these projects. ●

Israel signs utility services agreement with Cyprus and Greece

Israel has signed a three-way MoU with Cyprus and Greece to improve cooperation on electricity, gas and water, which includes a wastewater treatment project and a wastewater reuse project.

Cypriot minister of agriculture, natural resources and environment, Nicos Kouyialis, said: 'A new era of cooperation starts today in the field of sewage treatment and wastewater reuse that will help

Cyprus improve its water balance, as substantial and constant quantities of recycled water will be utilized in the best possible way.'

The recycled water is intended for agricultural use. Israel's national water company Mekorot has also inaugurated the island's new €50 million (\$66.4 million), 40,000m³/day fifth desalination plant. Greece is involved in a massive energy interconnector project. ●

Manila Water Services purchases Saigon Water Infrastructure shares

Following its successful entry into the Vietnamese water sector, a Manila Water Services subsidiary recently signed an investment agreement with Saigon Water Infrastructure Corp (SII) to purchase 31.47% of the utility's outstanding capital stock.

In its disclosure to the Philippine stock exchange, Manila Water Services announced that its Singapore subsidiary, Manila Water South Asia Holdings, is to undertake the purchase of 18.37 million of SII's primary shares.

Under the agreement the Manila subsidiary will pay an undisclosed sum within 105 days, after Saigon Water complies with a number of preconditions for the investment. Local press estimate the shares to be worth VND400 billion (\$20 million).

SII has said it is aiming to become the first fully-integrated company in the Vietnam water and wastewater infrastructure sector, constructing water and wastewater treatment plants and providing engineering, operation and management services and similar activities.

The company is in line to construct the Pleiku water plant in Gia Lai province and the Du Long plant in Ninh Thuan province, which are worth VND400 billion (\$20 million) combined and will have capacities of 30,000m³/day and 15,000m³/day respectively.

Manila Water is said to have invested around \$100 million in the Vietnam water treatment sector, including a 49% stake in the Thu Duc Water Build-Own-Operate project and a 47% stake in the Kenh Dong water plant project. ●

Detroit bankruptcy may impact US municipal bond market

The US city of Detroit's bankruptcy has sparked a battle over its water and sewer bonds that could have wider implications for the US' municipal bond market.

The various fund companies, insurers and individuals that hold over \$5 billion of Detroit water and sewer bonds are resisting a plan to restructure the debt, put forward by the city's emergency manager Kevyn Orr.

Mr Orr has asked bondholders to agree a plan to replace some outstanding bonds with new versions that have different terms, a move that could free millions of dollars for the city's pressing financial needs.

However, some bondholders are said to be refusing to consider such a switch, fearing the move could set a dangerous precedent that could affect potential purchasers of other 'safe' municipal debt and make municipal financing in other states and cities more difficult.

Mr Orr is said to be planning to engage a consultancy to value the city's water and sewer system, and he has also proposed restructuring the ownership of the system by creating a regional authority, which would pay Detroit a monthly sum to lease the system before the investors are paid back.

The Detroit situation has already been affecting other areas – in Bay City, Michigan, Bay County officials were reported to have voiced concerns to the county's Department of Water and Sewer director that the bankruptcy could impact the sale of bonds there to build a new regional treatment plant.

The director acknowledged that there could be some effect on the proposed next \$30 million bond sale, which would be expected to have a 5% interest rate compared with a 2% interest rate for the previous bond issue. ●

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Research into indirect potable reuse shows growth potential

A report on municipal wastewater reuse compiled by water technology market intelligence company BlueTech Research has highlighted growth potential in the number of indirect potable reuse (IPR) projects around the world.

The report predicts that within the US the number of such projects will double in the next decade. Non-potable applications currently account for 87% of all municipal wastewater reuse projects in the US.

However, the report claims that the

market for IPR projects will grow faster than non-potable reuse projects, due to lower marginal costs and a growing demand for potable water, although non-potable reuse projects will continue to grow steadily.

The report notes that though regulations for IPR are not very developed, California's Title 22 water reuse regulations could affect the future market.

The regulations stipulate the use of reverse osmosis treatment followed by an

oxidation step, referred to as Full Advanced Treatment (FAT). If other jurisdictions follow suit, the report predicts that demand for reverse osmosis, membrane filtration and advanced oxidation processes will grow significantly.

UV will continue to grow in IPR as the dominant technology, BlueTech says, and also in non-potable reuse projects where chlorination is currently the dominant disinfection technology, due to concerns about byproducts and safety. ●

California wildfire prompts water resource concerns

Utility managers for the San Francisco Public Utility Commission took action at the end of August to move water quickly from the city's critical Hetch Hetchy reservoir via a new \$4.6 billion gravity-operated pipeline system, as firefighters worked to contain a massive wildfire. The wildfire in the Yosemite National Park at one stage covered around 230 square miles (595.7km²), making it the largest on record in California's Sierra Nevada.

CH2M HILL awarded \$80 million contract for biosolids upgrades

CH2M HILL has joined with Brown and Caldwell and been awarded an \$80 million contract by the San Francisco Public Utilities Commission (SFPUC) to provide planning and engineering

services for the Southeast Plant Biosolids Digester Facilities Project; a \$1.5-billion capital investment that will provide critical upgrades for San Francisco's wastewater system. The project will replace all biosolids processes at San Francisco's Southeast Water Pollution Control Plant, including anaerobic digesters, solids dewatering, solids thickening, odour control and energy recovery facilities.

Report highlights market potential of service provision

Many of the poorest, un-served people in developing countries, for whom public water and sanitation services are out of reach, could increasingly rely on service provision through the domestic private sector, a new World Bank report says. The report, released by the World Bank's Water and Sanitation Program (WSP) and the

International Finance Corporation (IFC), notes that this will not only improve the livelihoods of such people, but that there is also an enormous untapped market potential.

Exxon Mobil MTBE ruling upheld

A US court of appeal has upheld a ruling against oil giant Exxon Mobil that ordered it to pay \$104.5 million to New York for polluting the city's groundwater with MTBE. The appeals panel rejected Exxon's argument – also used in its New Hampshire court case in April – that it was required to use MTBE under the Clean Air Act, which the company said pre-empts state or city laws. Exxon Mobil has also confirmed that it will appeal to the Supreme Court. New York took Exxon Mobil and other oil companies to court in 2009, alleging that they knew

MTBE would pollute groundwater and ignored advice from their own scientists and engineers not to use the additive where groundwater was to be used as a drinking water supply.

Water board and Coca-Cola sign MOU for safe drinking water

Sri Lanka's National Water Supply and Drainage Board and Coca-Cola Beverages Sri Lanka have signed a memorandum of understanding for a project to provide safe drinking water to areas affected by chronic kidney disease. Coca-Cola will provide resources for constructing an RO treatment plant and the infrastructure to house it. The plant will treat around 1500 litres/hour of water and will operate for 20 hours a day, providing water to over 1100 homes in the villages of the Padaviya DS division.

water utility management
INTERNATIONAL

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Water Utility Management International focuses on the interests of utility executives, policy makers and advisors around the world engaged with the key management issues faced by water and wastewater utilities. As well as senior utility managers, WUMI will be of interest to regulators, consultants, contractors, academics, and financial, technical and legal professionals.

Utility reform and achieving efficiency are central themes of the publication, encompassing topics such as benchmarking, investment

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Water Utility Management International is published four times a year by IWA Publishing. Statements made do not represent the views of the International Water Association or its Governing Board.

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Design & print
Layout: IPL Print & Design Ltd
Printed by Hobbs the Printers, UK

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SUBSCRIPTIONS

Water Utility Management International is available as either a print or an online subscription.

2013 price (4 issues):
£241 / €363 / \$480
(IWA members: £199 / €299 / \$378)

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www.iwaponline.com/wumi/default.htm

ISSN (print) 1747-7751
ISSN (online) 1747-776X
© IWA Publishing 2013



Publishing

UK's Thames Water criticised for looking to increase domestic bills

UK utility Thames Water has been heavily criticised for asking the economic regulator, Ofwat, for permission to increase domestic bills by 12%, or around £29 (\$45), during the 2014 to 2015 financial year.

The company has also asked Ofwat if it can spread the rise over more than one year. The money is needed, Thames says, to cover land purchase costs for the Thames Tideway tunnel, or 'super sewer', which will run underneath the Thames.

Ofwat is due to make a decision in early November. Thames CFO Stuart Siddal argued that 'at the beginning of a five-year period there are always a small number of potentially significant costs

and revenues that can be clearly identified, but not quantified.

'Either the company or Ofwat can seek an adjustment, upwards or downwards, once the actual costs and revenues are known. That is what we are doing now.'

The company also blamed an increase in bad debt due to the economic downturn, the cost of operating an additional 40,000km of private sewers transferred to its ownership in October 2011, and an increase in the charges it pays to the Environment Agency.

However, many influential voices have spoken out against the application. Sir Tony Redmond, for the Consumer Council for Water, said: 'Many other water companies absorbed the costs

that Thames say they are facing – and they have done so without applying for a further price increase. We believe that Thames Water should do the same.'

Westminster Council's Labour councillors have also written to Ofwat to urge the regulator to reject Thames's application. Group leader Paul Dimoldenberg said in a letter to Ofwat that he found the application 'staggering, particularly as they offer no social tariffs to those struggling to pay their bills'.

Ofwat chief executive Regina Finn said: 'We will challenge these proposals and question the company strongly on their reasons. Proposed increases will only be allowed if they are fully justified.' ●

California announces hexavalent chromium drinking water standard

The California Department of Public Health has been the first in the US to announce a stricter drinking water standard for hexavalent chromium (chromium-6).

Dr Ron Chapman, CDPH director and public health officer said: 'California is the first and only state in the nation to establish a maximum contaminant level specifically for chromium-6 in drinking water.'

'Establishing this new MCL underscores California's commitment to safe drinking water standards to protect the public health.' The proposed regulations set the maximum contaminant level (MCL) for chromium-6 in drinking water at 10ppb and specifically regulate the hexavalent

form of chromium.

This figure is five times less than the current total chromium standard of 50ppb, which includes both trivalent chromium (chromium-3) and chromium-6. The federal MCL for total chromium is 100ppb.

Chromium-3 is a harmless and required nutrient, but chromium-6 may pose a risk of cancer when ingested, the department notes. In 2001, California was the first state to require a MCL for chromium-6 after the high-profile case of the town of Hinkley.

The department notes that it has performed a series of rigorous analyses that considered, among other things the occurrence of chromium-6 in drinking water

sources statewide, the methods, feasibility and costs of detection, treatment and monitoring technology, and the relative health benefit that could be obtained at various MCL levels.

Some criticism has already surfaced. The California-Nevada section of the AWWA released a statement saying: 'Field research on viable treatment technologies to efficiently remove Cr-6 from water has shown that a very low drinking water standard for Cr-6 could come at a tremendous cost to the public. Very small water systems, and those serving poor populations, will face the greatest challenge to meet the regulation.' ●

Monterey peninsula desalination project reaches settlements

California American Water recently announced that it has reached formal settlements with various parties for its proposed desalination project for the Monterey peninsula.

The settlement agreement recognises the value of a 'portfolio' approach that also embraces aquifer storage and recovery and groundwater replenishment.

Key issues addressed in the settlement include criteria for moving forward with the groundwater replenishment project,

the development of a hydrogeological study and technical report on pumping from proposed slant wells to guide Cal-Am's use of source water, project costs, contingency plans for the desalination plant intake, discharge and location, and various financing mechanisms.

A pre-hearing conference was set for mid-September, and the settlement agreements are pending CPUC approval and will not take effect until CPUC reviews and approves them. ●

Independent audit of Sydney Water's marketing and IT programmes announced

The New South Wales minister for finance and services, Andrew Constance, has announced that the state is to undertake an independent audit of Sydney Water's marketing and IT programmes.

The news followed a revelation in July that the utility spent 4.5% of its three-yearly IT budget, around AUD\$7.1 million (\$6.4 million), on developing a new website. At the time Sydney water defended the investment, saying that the website came in AUD\$700,000

(\$632,340) under budget.

Mr Constance said in a statement: 'The NSW government is determined to place downward pressure on the cost of living, and water bills are an important part of that commitment.'

He added: 'The Department of Finance and Services has been tasked with carrying out an audit and will provide a report to me on the current status of Sydney Water's marketing and IT expenditures, and recommend if there are any opportunities to deliver savings.' ●

Israeli fluoridation highlights widespread debate

Israel recent ending of fluoridation of drinking water highlights a debate taking place in many countries as to whether fluoride should be added to water. **LIS STEDMAN** reports on the case.

The decision by Israel's Supreme Court to end fluoridation follows a number of reversals in recent years for the often-controversial water additive.

The US cities of Wichita in Kansas and Portland in Oregon, as well as Windsor, Ontario in Canada recently rejected fluoridation, and councillors in the city of Hamilton in New Zealand voted to end 50 years of fluoridation.

However, the Israeli determination came about because of a highly-legal argument, rather than the claims of the organisation that brought the case regarding the alleged dangers of the substance.

The court ruled that the new regulation, which superseded the 1970s mandatory fluoridation regulation and removed the mandatory element, did set an obligation of adding fluoride to drinking water under certain circumstances, but that another section of the new regulations added that that obligation would be valid for one year only.

The respondents subsequently claimed that with the new regulations, the petition

was redundant. The court responded that because of the cancellation of the original regulations and the expiration of the critical clause in the new regulations within one year, the petition was exhausted and should be stricken, but noted that the phrasing of the new regulations was 'not optimal as far as clarity of the law is concerned'.

The judgment adds that 'it would have been better to set the rule of non-fluorination as a primary arrangement, and the continuation of the fluorination as a temporary transitory provision, instead of the manner in which it has been done.'

Other countries that fluoridate widely include the US, where around 70% of cities use fluoridation, as well as Canada, Ireland, New Zealand, Hong Kong, Singapore and Australia. In Europe fluoridation is legal but sporadically adopted – in the UK around six million people drink fluoridated water.

However, anti-fluoride groups have claimed links with a spread of health issues including reduced thyroid and kidney

function, infertility, reduced bone strength, heart disease and an increased risk of cancer as well as dental fluorosis.

Others, however, have not greeted the decision with as much enthusiasm. The Israel Pediatric Association has warned that the new regulations could compromise children's dental health.

The move is set against a background of increasing resistance to fluoridation – in March 2007 a Health ministry committee recommended the revocation of mandatory fluoridation, adding it only where the population needed it.

This suggestion was not acted upon despite being ratified by the Knesset Health Committee, because of internal ministry objections to fluoridation, local press suggest. Health minister Yael German is also recognised, from her time as mayor of Herzliya, as an opponent of mandatory fluoridation. At that time she noted that there were more effective and safer ways to protect children's teeth such as fluoride toothpaste and education. ●

Montreal's water infrastructure major election issue

Montreal has been struggling to tackle the serious deterioration of its water infrastructure, despite a significant rise in water taxes.

LIS STEDMAN reports on the city's problems.

Montreal's extensive but aging water and wastewater infrastructure is still prone to significant problems, over halfway through the period of a project that was intended to ensure these were consigned to the Canadian city's past.

The issues are well exemplified by a massive 3m deep, 15m long crater, caused by a 137-year-old sewer pipe at a busy intersection last August, which created traffic chaos. The city also has a reported water loss figure of around 40%, and the current problems are viewed as the legacy of at least four decades of under-spending.

The city has significantly raised its water taxes, by CAN\$53 million (\$50.4 million) between 2001 and 2008 and a further CAN\$36 million (\$34.2 million) since then, in a bid to find solutions for its 3500km of water infrastructure and a similar length of wastewater network.

Former mayor Gérard Tremblay took on the task of renewing the city's deteriorating

infrastructure in 2002, though not always with unalloyed success, and it has become a significant issue for the future mayor in the city's forthcoming elections in November.

One local paper, the Montreal Gazette, asked four mayoral candidates about the importance of the issue. Denis Coderre, a former Liberal MP, noted that 'someone has to take responsibility and be accountable for it', adding 'we need better prevention.' Coderre would like to see an online reporting system for leaks, cracks and potholes.

Coalition Montréal head Marcel Côté also promised large-scale infrastructure spending as part of his party's election platform. He told the paper: 'We have to decide how much money to spend... and once we do, we need to use it wisely and plan the work professionally. It's not a question of money, but money that's not being well managed.'

He added that he would like an expert in place to challenge city officials and projects

that are put forward.

Projet Montréal candidate Richard Bergeron was more optimistic, declaring that 'the worst, vis-à-vis water work, is behind us'. He noted improvements in water use and leakage figures, and claimed 'the situation really has improved in the last decade – even if we paid too much for it', though he also noted that the extent of corruption from 2006 to 2009 'can never, never happen again'.

This allusion refers to a major conflict-of-interest scandal that arose during the tenure of Mr Tremblay, which resulted in the cancellation of a \$355 million water meter contract, although no individual blame was ever apportioned.

A fourth candidate, lawyer Mélanie Joly, said she and her party would like to review the bidding process for infrastructure contracts, so that winning bids were chosen not just on being for the lowest price, but would also be based on performance. ●

The EU wastewater gap – newer accession countries lagging behind

A new EU report has focused on wastewater treatment collection and treatment across its member countries, showing a stark contrast between the 15 older EU members and those which joined after 2004. LIS STEDMAN reports on the report's main results.

The latest EU report on wastewater treatment dramatically highlights the disparities between the EU-15 – the long-standing EU members that joined before 2004 – and the more recent accession countries, known as the EU-12.

The EU-12 are Bulgaria, the Czech Republic, Estonia, Cyprus, Latvia, Lithuania, Hungary, Malta, Poland, Romania, Slovenia and Slovakia, and the EU-15 are Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden and the UK.

There were, of course, some caveats. For Romania, none of the compliance deadlines agreed in their accession treaty had expired by 2010, the reporting period of this report. Croatia, which joined in 2013, was not included in the reporting.

Several other member states that joined in 2004 or 2007 had deadlines that expired during the reporting period, though many towns and cities in these states had compliance deadlines in and beyond 2010 that saw them excluded from the report as well.

The differences between the two groups of states could not be more stark. Fifteen member states collect all of their polluting load, but five had compliance rates below 30% in 2009/2010 – Bulgaria, Cyprus, Estonia, Latvia and Slovenia.

For secondary treatment, the EU-12 also trail significantly behind. Four of the old EU-15 have 100% compliance, and another six had 97%, but just 39% of EU-12 wastewaters were receiving appropriate secondary treatment. Just the Czech Republic, Hungary, Lithuania and the Slovak Republic achieved compliance results between 80 and 100%.

For tertiary treatment the situation is naturally more divided, with an overall compliance rate of 77%, but particular delays in implementation of this more stringent level of treatment in the EU-12 that have caused levels there of just 14%. On the positive side, four countries reached 100% compliance.

Looking at the table for compliance results for collection, secondary and tertiary treatment together it can be seen that Austria, Germany and The Netherlands are front runners with 100%

compliance on all fronts. They are closely followed by Greece, which is slightly behind on secondary treatment, Finland, with slight secondary and tertiary treatment issues, and then Denmark and Sweden, lagging somewhat on tertiary treatment (around 95% and 87% respectively).

Below this group are France, Italy, Lithuania and the UK, in that order. The UK and Lithuania both have 100% collection rates and the UK's secondary treatment rate is also close to 100%, but it is significantly behind on tertiary treatment at roughly 63%. Lithuania's tertiary treatment record is considerably better, in the region of 85%.

Further down the table, there are some interesting figures – the Czech Republic and Slovakia both have 100% collection rates, but lower secondary treatment at around 81% and 90% respectively, and tertiary treatment rates of no more than 20%.

Near the bottom of the table Malta and Ireland have 100% collection rates, but poor treatment rates – Malta shows barely 5% secondary treatment and Ireland 40%, with the former reporting no tertiary treatment and the latter a tiny percentage.

Of course, much of the difference is explained by the requirements for compliance – the EU-15 had a tranche of deadlines, the latest of which expired in 2005, and even so countries in this group occasionally appear in the EU's press releases having been taken to the European Court of Justice for wastewater-related non-compliance.

Research looking forward to full implementation of the UWWTD, undertaken under the FATE project – a group of activities related to the assessment of fate and impacts of pollutants in terrestrial and aquatic ecosystems – warns that in some parts of Europe this could initially result in an increase in point source emissions, from non-collected emissions, in particular in the lower Danube basin. This would occur because small agglomerations that do not have drainage systems would have more organised collection and discharge systems, creating new point sources that currently do not exist.

However, the conclusion is that while this might blunt the effectiveness of nutrient

reduction to the Black Sea, it would still lead to environmental improvements such as reduced groundwater pollution.

EU funding, of course, has been and will continue to be critical. In the current programming period, 2007 to 2013, around €14.3 billion (\$18.9 billion) has been planned to support wastewater-related investments. Nevertheless, despite the EU money, the recent 'fitness check' of EU freshwater policy stressed that most of the funds required to implement EU water policy must be generated within member states – and the financing gap is still significant.

The reasons for this are well known – progress towards achieving cost recovery and implementation of the 'polluter pays' principle has been slow and insufficient in most member states. To try to promote change, the Water Framework Directive includes requirements on water pricing, and the EC continues to launch infringement procedures. Even today, around 20 of what the EU styles 'horizontal grouped cases' against ten of the original EU-15 are still open.

Considering the prospects of achieving compliance through infringement procedures as 'not encouraging', a new approach is envisioned under the proposed 7th Environmental Action Programme and the Blueprint to safeguard Europe's water resources.

This proposes specific actions, including national systems to actively spread information about how EU environmental legislation is being implemented, coupled with an EU-level overview of individual states' performance. EC/member state partnership implementation agreements are also envisaged.

In conclusion, the report is largely positive about the situation in the EU-15. With continuing effort, it predicts that implementation will largely be complete by 2015 or 2016, albeit ten years after the last original UWWTD deadline.

For new member states, the situation is different. Their road will be much longer, and delays could be considerable, with the report predicting possible full implementation as late as 2028. Work on the 'new approach' activities began last year, and this report underlines its importance. ●

Performance assessment aids decision making to improve Buenos Aires' water services

Performance indicators have been used for many years to collect information on water and sewage services in the Argentinian capital Buenos Aires; being carried forward through changes in the utility's management. **ALEJO MOLINARI** discusses how analysis of the data provided by the continued benchmarking can show the development of the utility's performance and provide a valuable comparison to other utilities, aiding decision making.

Buenos Aires, Argentina. Credit: Rafael Martin-Gaitero / Shutterstock.com.



Water and sewage services in the Metropolitan Area of Buenos Aires in Argentina were provided by a public utility until 1993. From that date, Aguas Argentinas SA (AASA), a consortium led by the French company Suez (Lyonnaise des Eaux), took over the services under a concession contract, signed by the national authorities. A regulatory body (ETOSS) was created for the control and regulation of the services provided.

By the end of the '90s, after a long period of negotiation, AASA agreed to provide the regulator with information to elaborate a set of performance indicators (PIs) for performance assessment. That information was included in the annual reports. The PIs adopted were based upon IWA manuals, adopting the same definitions and technology.

In March 2006, after several years

of negotiation between AASA and the National State, AASA took the decision to recede the concession contract, generating a state-owned company, Agua y Saneamientos Argentinos SA (AySA), to provide the services by means of a new concession contract. The Ministry of Federal Planning, Public Investments and

Services (MINPLAN) holds 90% of the new company's shares and the remaining 10% is owned by the workers, represented by the unions. Parliament issued Law 26221/07 approving the new regulatory framework. This entrusted the Sub-Secretary of Hydraulic Resources (SSRH), a sub-department of MIN-

Figure 1: Daily water production per account 1999-2011

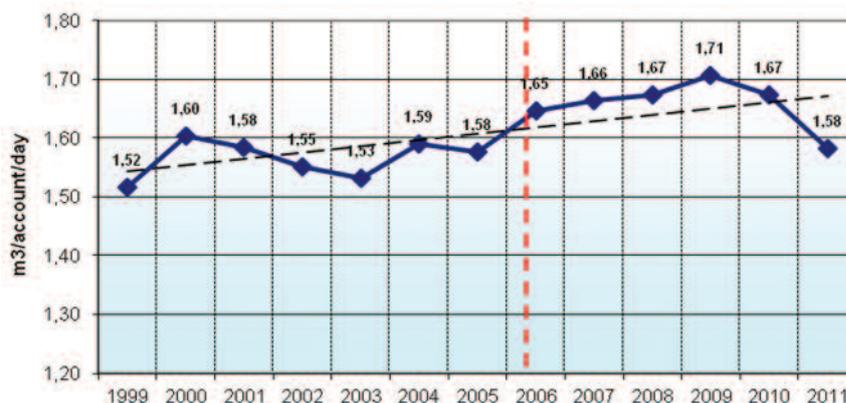
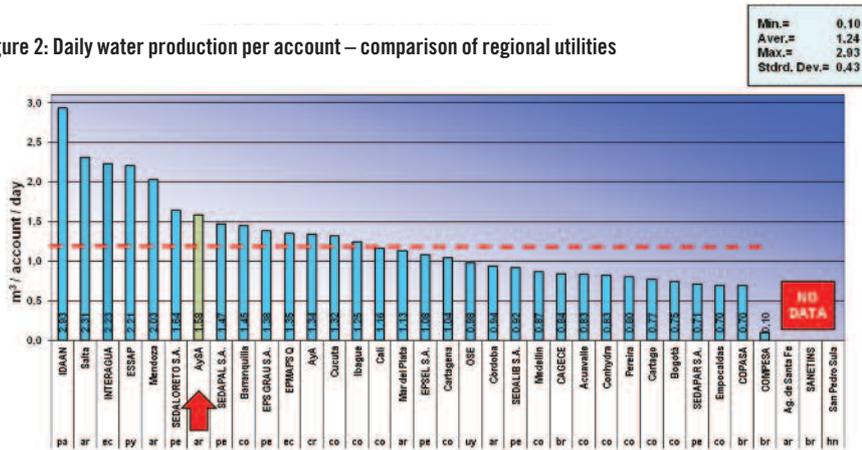


Figure 2: Daily water production per account – comparison of regional utilities



PLAN, with the regulatory functions and substituted the old regulator body with a new agency (ERAS) to control service provision and another agency (APLA) to control the investment programme.

Utility performance and benchmarking

The main function of ERAS is to inform SSRH about the utility's performance. Benchmarking was included in the new regulatory framework to compare the utility's performance both historically with itself and to other utilities in the country and abroad, with the aim of generating some competition and illustrate decision making to the authorities (SSRH). The PIs scheme inaugurated by the previous operator (AASA) survived the institutional transition, and was entrusted to the new agency ERAS, where a new division of benchmarking was created.

The ISO 24500 asset management standards had been formed by that time and, based on the mandate of the regulatory framework of using recognized benchmarking techniques, the benchmarking division of ERAS proposed the adoption of these new norms to the concessionaire. The concessionaire did not consider the proposal, deciding to consider it in the future. Despite this, the principles of ISO 24500 have been adopted in the renewed PIs scheme.

Some new PIs have been added to the previous scheme, oriented to follow the evolution of some obligations introduced by the new concession contract, but the main body of PIs are still the same IWA PIs, defined for the previous concessionaire. This allows for the comparison with other utilities in the region and across the country through the ADERASA benchmarking yearly exercise, and eventually with other utilities around the world

through the IBNET PIs database and other benchmarking schemes based upon IWA PIs.

Since the main definitions of the PIs remained the same it is possible to monitor the evolution of some aspects as the management changed. An example of that can be the daily water production by account seen in Figure 1 (dotted line indicates institutional change). The same PI is compared regionally through the ADERASA PIs exercise (Figure 2).

There are still some information

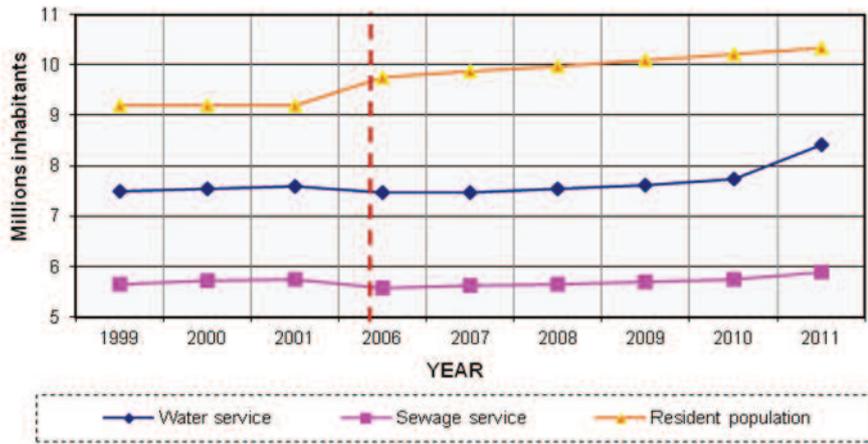
gaps that have to be resolved. With the change of operator, some methodologies of metering have been changed. That is reflected in some PIs, like for instance in the service coverage ratio (Figure 3).

In Figure 3 we can see that coverage ratio both in water and sewage declines in the year 2006, when the incumbent was changed, but population served continued to grow steadily. There are also some inconsistencies that have to be revised, like the increase of population served, shown in Figure 3, and the increase of network extension shown in Figure 4.

We can appreciate that the sudden increase of population served with water in 2001 is not reflected in the expansion of the water network for the same year, while the increase in population served with sewage is consistent with the expansion of the sewage network.

Another aspect to work with is the quantity of information provided, since much data is still missing. For 2011 only 84% of the required variables were reported, so only 68% of the desired PIs have been calculated,

Figure 3: Water and sewage services coverage



giving only a partial image of the performance of the utility.

Benchmarking results

To illustrate the result of the process, some conclusions extracted from the last benchmarking analysis (data from 2011) are here summarized:

Access of services

During 2011 the concessionaire incorporated a large number of customers into its water supply service catchment, but information is not consistent and has to be revised. The incorporation of new customers into the sewage network remained at the same pace as previous years. In the regional comparison both services coverage were below the sample average.

Affordability

The amount charged by account was almost constant and represented

a continuously minor proportion of the minimum salary. In the international context it was among the lowest tariffs in the region.

Public health protection

Some aspects of water quality delivered to customers had been improved over the previous year, changing the tendency of years before that. There was no data to analyze the pressure and service continuity, but the increase in customer complaints indicates that these aspects of service quality have been deteriorating in recent years. Sewage overflows had decreased with respect to previous years as a consequence of major pipe cleaning activities.

Assets management

There was no information to evaluate pipe breaks. The renovation of pipes had increased with respect to previous years, but the renovation of domestic

connections was not keeping pace. The sewage network had a similar evaluation. Nevertheless, the general level of these activities is still low regarding the recommended goals in the industry.

Environment

Water losses increased slightly compared to previous years, and the system ranked average in the regional comparison. Micro-metering had not increased and was among the lowest in the regional comparison. Sewage treatment had grown slightly, but was still among the lowest in the international comparison. There is no information to evaluate the energy efficiency.

Compliance with customer's expectations

Commercial complaints and service quality complaints continued to increase, more than in previous years. Still, in the regional comparison it came in as average.

Financial sustainability

Operational costs were increasing while incomes remained constant, making subsidies more substantial in the financial operations of the concession. Operational costs were among the lowest in the regional comparison, but climbing some places with respect to previous years.

Conclusion

This information is elaborated yearly by the ERAS benchmarking department and supplied to the authorities so they can then make the relevant adjustments together with the utility's management. It is also published on ERAS's website, providing customers and other stakeholders with a clear and concise description of the performance of the state-owned utility. It seems that putting this information in the public domain has had some impact on certain aspects of the service, which have improved in recent years. ●

This paper was presented at the 5th IWA International Conference on Benchmarking and Performance Assessment of Water Services in Medellín, Colombia, held 9-12 April 2013.

About the author:

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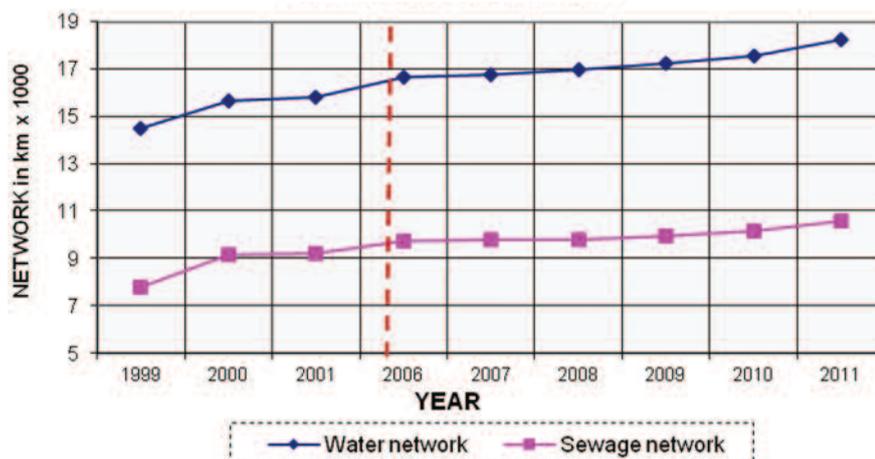


Figure 4: Network extension

Utility reform in Lebanon – a case study

The consolidation of water utilities as part of water and wastewater service reform is the first step on a path towards the decentralization of institutional, administrative, and fiscal responsibilities and the improvement of service quality. **SAMUEL COXSON** and **WALTER WEAVER** discuss the case study of Lebanon and how decentralization has progressed since the consolidation of 21 water authorities into four regional water establishments.



Sam Coxson



Walter Weaver

The literature on consolidation followed by decentralization of local governments presents a framework that is helpful not only to local government but also to sector reforms such as water and wastewater.¹ This framework can help to define the levels of autonomy and effective functioning of institutional (political), administrative and fiscal decentralization afforded to a local or regional utility. National reform of water and wastewater sector policies, organization, and service provision may entail – as in the case of Lebanon – the consolidation of smaller utilities into larger ones to benefit from economies of scale. This paper will use this governance framework to focus on what happens after consolidation, and will examine the decentralization process that occurred in Lebanon following the passage of Laws 221 (the merging of 21 water authorities into four regional water establishments) and 247 (the merging of the Ministry of Electrical and Water Resources and the Ministry of Oil) in 2000.²

Utility reform framework

The modified framework for planning, reviewing and analyzing sector reform progress in the specific case of Lebanon's water and wastewater utilities offers a consistent method of looking at the decentralization process post consolidation. This framework may be useful to others who plan, or are carrying out, water sector reform in their own country. Additionally, the water reform framework contains critical utility performance and accountability feedback measures that planners, policy makers and implementers must make as part of the reform management process.

The definitions used in this modified reform framework will assist in placing reform progress into perspective. Devolution, deconcentration, and delegation are the key general terms used in reference to decentralization. However, these terms are further altered by the extent of political (institutional), administrative and fiscal decentralization. Performance monitoring and accountability have also been added to the discourse in order to complete the general framework. Each of these terms are further defined in ways that allow us to overlay the Lebanese context and plan

further reform actions, as well as assess the progress of devolution's implementation.

Evaluative template as part of the framework

It is possible to develop a template tailored to the specific information of one country (Lebanon) and to specific reforms in the water and wastewater sector. Starting with devolution as the specific form of decentralization, we can then add the institutional, administrative, and fiscal decentralization review as well as the performance monitoring and accountability evaluation.

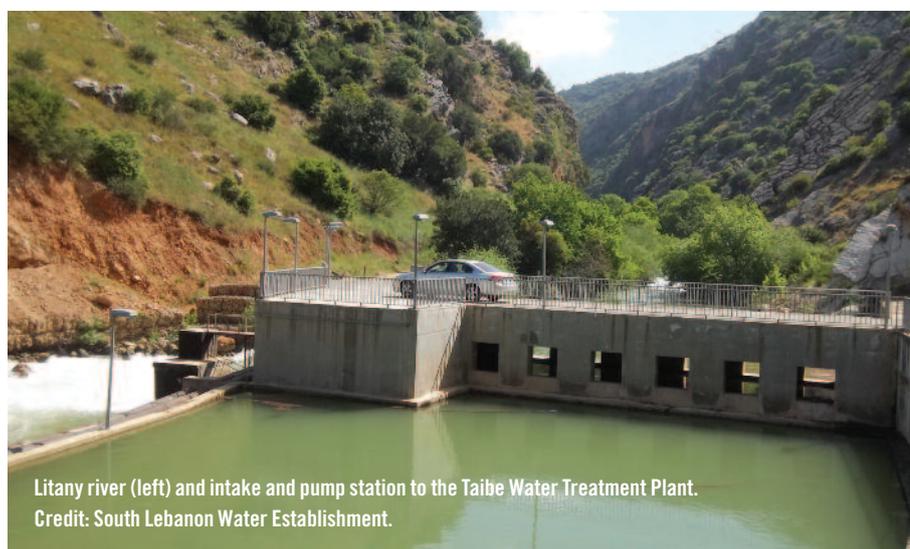
The primary distinction of devolution, as opposed to delegation or deconcentration, is the space for the local entity to make decisions on its own, with the minimal regulation and interference of political or governmental entities from the national or regional level. In reality, pure forms of devolution rarely exist. Typically, some level of national, or national and regional, political intervention is to be expected. Also, if we add the performance and accountability criteria, we should expect policy, administration and funding from the national or regional level to be affected by the results in performance and accountability.

As the template below indicates, the devolution process is a continuous cycle with the results of the institutional, administrative, and fiscal decentralization affecting the performance and accountability of the utility, which in turn affects the level of autonomy to be exercised by the utility as set by policy makers and lenders.

Illustrative indicators of decentralization applied to sector reform in Lebanon

Institutional, administrative, and fiscal decentralization and performance management as well as accountability need to be tailored for each country or region within a country. Some illustrative indicators used for the Lebanon case study are presented below:

Institutional decentralization:



Litany river (left) and intake and pump station to the Taibe Water Treatment Plant.
Credit: South Lebanon Water Establishment.

Table 1: Scoring of Lebanese water and wastewater sector reform – institutional decentralization

Illustrative indicators of decentralization	Scoring range	Score for Lebanon reform progress
1. Presence of national water and wastewater strategies and action plans	0 = None 1 = Presence	1
2. Clear and comprehensive policies covering general water and wastewater service provision	0-4 ¹	1
3. Effective policies, procedures and working relationships with other ministries that have some say over water and wastewater services	0-4	0
4. Capacity to oversee or regulate autonomous utilities	0-4	2
5. Absence of political intervention	0-4	0
6. Realignment of authority to ensure successful devolution	0-4	0
7. Willingness to set tariffs that ensure utility sustainability	0-4	0
8. Shut-off policies supported and enforced	0-4	0
Total	29	4 ²

¹ Zero is no effort made towards a decentralization activity; one represents some activity but less than 50 percent; two represents approximately 50% completed; three indicates approximately 75% completed; and four represents a completed decentralization activity.

² For Lebanon utility decentralization, four out of 29 represents approximately 14 percent of the total template points obtainable.

- Presence of national water and wastewater strategies and action plans
- Clear and comprehensive policies in utility oversight (operations, water quality, direct assistance from the Ministry of Energy and Water)
- Effective policies, procedures and working relationships with other ministries that have some say over water and wastewater services
- Capacity to oversee or regulate autonomous utilities
- Absence of political intervention
- Realignment of authority to ensure successful devolution
- Willingness to set tariffs that ensure utility financial sustainability
- Shut off policies supported and enforced

Administrative decentralization:

- Capacity of utility to plan and execute infrastructure projects (or hire those that can)
- Capacity to manage operations effectively and efficiently
- Authority to hire, fire and promote personnel based on performance
- Capacity to accurately, timely and

transparently present financial and operational reports

- Presence of agreed upon financial and operational performance benchmarks that stakeholders help set

Fiscal decentralization:

- Capacity to plan and execute business plans, budgets and capital projects and to deal with capital markets
- Freedom to enter into multi-year subcontracts with suppliers and service providers (include Public Private Partnerships, and Private Sector Participation arrangements)
- Efficiencies in collection rates
- Decrease in water loss

Performance monitoring:

- Established set of performance criteria that will be used in reviewing utility performance
- Stakeholder presence and voice in performance criteria setting
- Initial use of industry standards for performance
- Published water quality reports
- Incentives for high achievers (individuals or whole water establishments (WEs))

Accountability:

- Responsiveness to customer problems, requests and inquiries
- Periodic surveys of customer satisfaction with service provided
- Incorporation of customer concerns into the business and capital plans
- Financials that are accepted by the lending community
- Water demand management strategies involving customers

Note that the illustrative examples initially do not prioritize indicators. This may be done for a specific country after some baseline analysis has been completed. Once priorities are set for a specific country, a reform action plan can be developed.

Utility reform in Lebanon after 2000 – a case study

Starting with the passage of Law 221 in 2000, the 21 water authorities were consolidated into four major regional water and wastewater establishments.³ A five-year merger process was supposed to enable all the previous regional authorities to transfer assets to the WEs. However, this process was interrupted by the Israeli invasion of Lebanon, and still remains incomplete in some parts of the Bekaa Valley. Additionally, a substantial number of municipalities within the Bekaa Valley Water Establishment (BWE), South Lebanon Water Establishment (SLWE), and the North Lebanon Water Establishment (NLWE) jurisdictions operate their own water and sewerage collection systems, though many do not have wastewater treatment plants.⁴ The consolidation is also incomplete because

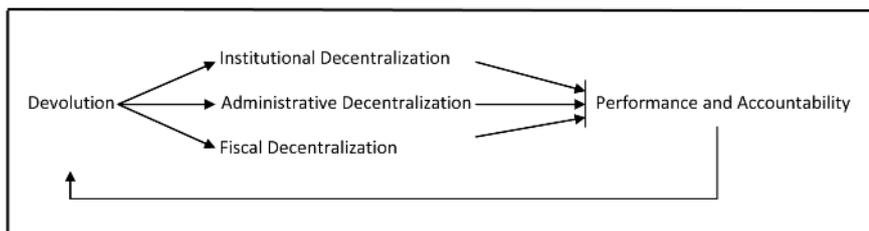


Figure 1: General devolution framework template

Table 2: Scoring of Lebanese water and wastewater sector reform – administrative decentralization

Illustrative indicators of decentralization	Scoring range	Score for Lebanon reform progress
1. Capacity of utility to plan and execute infrastructure projects (or hire those that can)	0-4 ¹	0
2. Capacity to manage operations effectively and efficiently	0-4	3
3. Authority to hire, fire and promote personnel based on performance	0-4	1
4. Capacity to accurately, timely and transparently present various reports	0-4	1
5. Presence of agreed upon performance benchmarks that stakeholders help set	0-4	1
Total	20	6 ²

¹ Numbers represent same level of activity as Table 1.

² Six points out of 20 is 30 percent of the total possible points that could be obtained in the administrative decentralization illustrative examples.

Law 221 and subsequent amendments do not clearly delineate asset ownership and what is meant by management of the water and wastewater service. For example, in 2008 the Ministry of Justice issued a ruling that municipalities that have installed wastewater collection systems owned them, rather than the regional WEs. The same applies to municipally funded water treatment and distribution systems.

The Ministry of Energy and Water (MOEW), the Ministry of Health (MOH), the Ministry of Environment (MOE) and, to a certain extent, the Ministry of Interior and Municipalities (MOIM) has some role in water quality, treatment and supply, and wastewater treatment and disposition (sludge and reusable water). However, there is little effective coordination among the ministries, and there is no operating committee or commission that would pull all the disparate policies that each ministry carries out into a comprehensive and effective policy implementation unit.

Most recently the MOEW has issued a National Water Sector Strategy (NWSS-2010) and a National Strategy for the Wastewater Sector (NSWS-2012).⁵ These two documents strive to present a broad picture of the capital needs through 2020 and target performance objectives in water supply, water conservation, utility collection effectiveness, manpower improvements (both capacity and numbers of workers), wastewater treatment, wastewater reuse and sludge disposition. These two strategies are significant planning, policy-making and implementation tools. The newly established strategies list not only the initiatives they want to pursue but also time frames and anticipated sources of resources. Unfortunately, a significant number of the initiatives are heavily reliant on donor assistance, which may or may not be forthcoming. Another important feature of the two strategies is that they establish some baseline data

from which to measure water and wastewater service improvement, and to some extent the performance of the WEs such as revenue collection and water loss reduction.

Water and wastewater service baseline

MOEW initially emphasized in the water sector strategy water supply improvements given shortages due to war damaged or incomplete water supply systems. However, the recent NSWS demonstrates a more holistic approach by integrating wastewater into the WEs' planning and capital funding process. The NWSS mandates that the WEs develop water, wastewater and irrigation master plans through the year 2020, using the two strategies as a guide. Concurrently, the two strategies proscribe utility performance levels in specific areas, primarily financial self-sustainability (rate of tariff collection and cost reduction, primarily in energy consumption).

However, there are substantial issues exist that the two strategies only vaguely acknowledge. With respect to water supply and irrigation, the NWSS does not adequately address the issue of municipalities operating water systems as opposed to turning these over to the WEs. These same municipalities tend not to bill customers for the water because the municipalities do not have the legal right to issue bills for the service. Municipalities, therefore, often use the funds received from the MOIM to cover water treatment and distribution. They also use these same funds to maintain and extend the sewage collection system and to operate a treatment plant if there is one, otherwise the wastewater flows into a nearby watercourse, or simply onto the land, constituting a threat to the aquifer below.

Another objective stated in the NWSS is to establish a Performance Evaluation Committee (PEC), per Law 221. There seems to be political resistance or lack of

political will to establish the PEC since the law's passage in 2000. This situation will be discussed more as we apply the framework overlay to the Lebanon baseline. The NSWS makes reference to the municipalities entering into agreements with a WE as though it were a fait accompli, yet field experience in attempting such agreements has only met with rejection on the part of municipalities and consternation on the part of the WEs because they acknowledge from the start that they have neither the manpower nor the funding to take over operation of wastewater treatment plants.⁶

Applying the framework

The progress that the MOEW has made in the last three years is substantial and should be commended as heading in the right direction. Applying the devolution framework presented above and scoring the WEs against various parameters demonstrate the general areas of progress and gaps. From the picture that evolves, one can begin to develop an action plan that further meets the reform agenda (strategic initiatives listed in the two national strategy documents).

Discussion of Table 1

Indicator 1: Lebanon has, through its MOEW, adopted water, wastewater and irrigation strategies with timelines to 2020. The strategies, although somewhat general and containing gaps, are an excellent step forward for the GOL and donors trying to figure out where to put their funding.

Indicator 2: GOL and MOEW have started to review policies and have asked donors for assistance in completing a task that would update existing policies relative to water supply, metering, water and wastewater tariffs, capital projects funding, wastewater and water quality standards and regulations. This has currently progressed by about 30 percent.

Indicator 3: GOL and its ministries

Table 3: Scoring of Lebanese water and wastewater sector reform – fiscal decentralization

Illustrative indicators of decentralization	Scoring range	Score for Lebanon reform progress
1. Capacity to plan and execute business plans, budgets and capital projects	0-4 ¹	2
2. Freedom to enter into multi-year subcontracts with suppliers and service providers (including PPP, PSP arrangements)	0-4	2
3. Efficiencies in collection rates	0-4	3
4. Reduced water loss	0-4	1
Total	20	8 ²

¹ Numbers represent same level of activity as Table 1.

² Eight out of a possible 20 points is 40 percent.

have generally discussed coordination of responsibilities, but much needs to be done before a policy coordinating panel meets on a regular basis and enables all the ministries to carry out their mandates while ensuring that the water sector policies adopted by GOL are met.

Indicator 4: MOEW's capacity to oversee and regulate is only partially fulfilled. MOEW functions as a regulator, but through using a delegation model rather than devolution. As long as MOEW intervenes on operational matters and is the financial guarantor to the WEs, MOEW will have majority ownership of the policy formation and implementation. MOEW has yet to establish a division for wastewater control and regulation. The ministry would need to staff such a division and enable it to enforce new water and wastewater treatment standards that are being preparation.

Indicator 5: The speed at which MOEW can undertake reforms is largely attributable to how supportive the Council of Ministers (COM) are and whether the reforms are supported not only by the MOEW minister but also COM and Parliament in general, and specific members of parliament in the four WE regions. Water shut-off is a case in point. All WEs have shut-off policies in their by-laws, but comprehensive application of the shut-off policy is very much influenced by the political representation of the non-paying water consumer.

Indicator 6: Clear and properly aligned roles and responsibilities between MOEW and the WEs have not been drafted, let alone approved by MOEW and COM. This effort will most likely be carried out as part of implementation of indicator two in the action plan.

Indicator 7: Utility tariffs are proposed by WEs and approved by MOEW. There is little correlation between what the ministry will approve and the actual per unit cost of supplying water and treating and disposing of wastewater. This situation will need to become more

predictable and relevant as MOEW undergoes its organizational and policy changes.

Indicator 8: As pointed out earlier, shut-off policies exist but are selectively enforced on a political basis. These policies need to be enforced, and the support to do so needs to come from MOEW or an independent auditing body. Aging of arrears and publication of those arrears would be one policy action that may have an impact on reducing arrears and thus financial sustainability of the utility.

Summary of institutional decentralization

The eight illustrative indicators are not prioritized by need or timing, but could easily be made to reflect a specific country's immediate need in terms of time or funding (or also applicable to a region within a country). For example, in Lebanon, item one in Table 2 has been MOEW's highest priority with respect to water supply infrastructure, followed closely by items two, three and four, in priority order. Items five, six, seven and eight are lower on the Lebanese priority scale based on public attitudes and the stated strategic initiatives. These lower priority items reflect the current high level of political intervention that pervades the whole government, and progress in their reform will take a long time if ever it is reduced. Therefore, a donor may choose items two, three, and four on which to concentrate their technical assistance.

Discussion of Table 2

Indicator 1: This illustrative benchmark indicates whether WEs can undertake major capital projects on their own or have dedicated staff that can manage large infrastructure projects. While it may not be feasible for the WEs to actually have staff qualified to design, bid, and oversee major infrastructure, it would be feasible for them to have staff qualified to manage the infrastructure process. Currently they outsource medium-sized projects,

and the Council for Development and Reconstruction (CDR), a national government body, designs and manages major projects.

Indicator 2: WEs generally do a fair job of managing the assets they have, but need additional qualified staff and need to adopt more efficient business processes and integrated IT systems that allow quick and accurate information sharing throughout the organization. Improving operations and maintenance has been ongoing, but several areas need to be addressed, such as the installation of consumption meters, reducing water losses, and establishing water conservation awareness programmes.

Indicator 3: WEs do not have legal authority to hire full-time, permanent employees on their own but must go through the civil service system that tests for positions and lists candidates by score and, depending on position, religious affiliation. But the position vacancies in the WEs are testament to the disconnection between the civil service system and WEs' needs. Not only is it difficult to recruit qualified candidates for specific positions, but regulated civil service salaries are virtually uncompetitive in the labour market. Worse, the top positions in WEs are political appointees, further complicating and politicizing all recruitment and human resource management overall.

Indicator 4: WEs have made some progress in accurate, timely and transparent reporting, but not all WEs have sufficient capability for this yet. Those that have received international donor assistance in upgrading their IT hardware and software are more capable of this than those that have not upgraded. For example, the Beirut-Mount Lebanon Water Establishment and BWE have received new IT software that integrates the financial accounting system with procurement, inventory, billing and collection and customer relations modules. This substantial step forward

Table 4: Scoring of Lebanese water and wastewater sector reform – performance monitoring

Illustrative indicators of decentralization	Scoring range	Score for Lebanon reform progress
1. Established set of performance criteria that will be used in reviewing utility performance	0-4 ¹	2
2. Stakeholder presence and voice in performance criteria setting	0-4	1
3. Initial use of industry standards for performance	0-4	2
4. Published water quality reports	0-4	0
5. Incentives for high achievers	0-4	0
Total	20	5 ²

¹ Numbers represent same level of activity as Table 1.

² Five out of a possible 20 points or 25 percent of the total points for the illustrative examples of performance monitoring.

at the WE level further supports other capacity building efforts such as meter reading and non-revenue water reduction.

Indicator 5: Although MOEW and the four WEs have established 12 basic benchmarks for performance, the WEs have not utilized the benchmarks in reporting to MOEW. Therefore, the low score in progress reflects the next steps in implementing a full programme, including annual or semi-annual benchmark reporting, a MOEW review, and joint actions taken to address areas where they have not yet achieved target benchmarks.

Summary of administrative decentralization

Of the five illustrative indicators, two, three, and four are the highest in need and time sensitivity. Indicator one is a priority that increase in importance as WEs substantially improve against other indicators. The same is true for item five. Therefore, donors have focused their technical assistance on items two, three and four.

Discussion of Table 3

Indicator 1: WEs have developed business plans that include small capital projects but not major projects. The Council of Development and Reconstruction has carried out the large capital projects for all WEs. The WEs' business plans cover a five-year period, but are updated annually and submitted to MOEW for approval.

Indicator 2: In 2012, MOEW approved a multi-year subcontract for services for SLWE. Prior to this, the WEs could only enter into one-year contracts. This is the first action by MOEW towards utilizing the private sector more to improve water and wastewater services. The decision will help increase competition to provide the services and perhaps lay the groundwork for increased private sector participation (PSP) in the water and wastewater sectors.

Indicator 3: MOEW has pressured all WEs to improve their tariff collection

rates from an average of 48 percent to 70 percent by the end of 2015. However, the next phase of improvement in tariff collection will not occur until billing can be based on consumption as opposed to a flat rate. As utilities begin to bill on a consumption basis, revenues decrease because consumers are using less water. WEs anticipate an initial lower collection once billing is based on consumption, but MOEW has agreed to make up the shortfall.

Indicator 4: Some public outreach in water conservation and efforts to meter source production and customer consumption has taken place. But efforts to reduce water theft have yet to be implemented.

Summary of fiscal decentralization

Given the difficulties of recruiting and selecting qualified staff, indicator two is the highest priority (based on statements in the NSWS, p.10), but items three and four are also very high priorities, in that order. Although the lowest ranking illustrative indicator is indicator one, it touches on all the other indicators and reflects the ability of the WE to become and remain autonomous. Donors have favoured indicator one for its part in a WE becoming autonomous, but should be willing to support items two, three and four.

Discussion of Table 4

Indicator 1: Several sets of criteria could be established, but the scoring and accuracy of the data are the major concerns once the performance criteria have been adopted.⁷ Although international donors have provided technical assistance for the development and reporting of performance criteria, WEs are not reporting these to MOEW.

Indicator 2: The stakeholders present in the development of performance criteria included only MOEW and WE staff, with no customer representation.

Indicator 3: When the international

donor provided assistance in developing performance criteria, it started with industry standard performance criteria. However, the WEs selectively chose only half of these, often mirroring the service incentive mechanisms used in many African countries. Even so, their poor score is based more on their lack of follow through and reporting than the actual indicators.

Indicator 4: None of the WEs publish water quality reports, due partly to a lack of staff as well as inadequate laboratory equipment. Additionally, the WE water testing regime is weak and needs to be strengthened as part of MOEW's oversight role.

Indicator 5: A bonus system exists within the civil service system, but everyone receives the bonus annually, thereby removing its nature as being an incentive. Concurrently, there is no reward to those WEs that are performing well with their limited resources (such as additional funding).

Summary of performance monitoring reform

Indicators one and three have received the most donor attention, but the overall performance monitoring effort does not have widespread support in MOEW or the WEs. A basic set of performance benchmarks has been developed using industry standard indicators as well as a few WE-specific indicators, but WEs do not report the indicators to MOEW. Further institutional and administrative initiatives need to be established for performance monitoring to be applied. For example, indicator four requires functioning laboratories and skilled staff to carry out the water testing protocols and assure willingness to report them to the public, but the treatment standards have not been updated. Donors have been working with MOEW and WEs to establish proper laboratory operations by providing lab training and essential equipment. A Lebanon national survey conducted in 2010 indicated that an

Table 5: Scoring of Lebanese water and wastewater sector reform – accountability

Illustrative indicators of decentralization	Scoring range	Score for Lebanon reform progress
1. Responsiveness to customer problems, requests and inquiries	0-4 ¹	2
2. Periodic surveys of customer satisfaction with service provided	0-4	0
3. Incorporation of customer concerns into the business and capital plans	0-4	1
4. Financials that are accepted by the lending community	0-4	1
5. Water demand management strategies involving customers	0-4	0
Total	20	4 ²

¹ Numbers represent same level of activity as Table 1.

² Four out of 20 possible points is 20 percent of the total possible points under accountability.

average of 80 percent of the population buys their drinking water based on the attitude that tap water is unsafe to drink or simply tastes bad. Therefore, progress relative to performance monitoring is linked to progress in institutional and administrative decentralization and reform. Continued donor assistance can make a significant contribution to the performance monitoring process.

Discussion of Table 5

Indicator 1: With the help of the international donor community, responsiveness to customer issues and requests for information and service problems have improved. However, the transition to a customer-service driven utility has a long way to go. Fortunately, the leadership of the utilities are starting to see the benefit of a customer-centric perspective, and are considering some organizational changes to reflect such a focus. Continued progress in this area will need to be coupled with new IT systems that enable WE staff to respond to inquiries and service requests. Immediate responses are required for questions or requests relating to billing and collection, and same day responses (within one working day) should apply to other issues.

Indicator 2: None of the WEs have utilized the tool of customer surveys to improve their knowledge of customers' concerns. As the dialogue with customers increases, it is anticipated that the tool will be seen as a valuable in improving customers' relations.

Indicator 3: As WE staff receive training in customer awareness and business planning through international donor programmes, the notion of listening to customers has begun to be absorbed. In the annual update of the business plan, areas such as revenue projections, possible new service coverage, and water conservation outreach programmes are included. Time will be needed along with continued technical assistance to raise the WEs to a new level

of customer interaction.

Indicator 4: Until 2012 no WE had borrowed from commercial banks, instead relying solely on funding from GOL and international donors for infrastructure projects (through grants and sovereign loans). In 2012, the largest WE was able to borrow \$140 million from the World Bank, naturally backed by GOL. However, the financial analysis and agreement to proceed with the loan was based on the WE's financials. This event indicates a small step toward actual autonomy. Still, the other three WEs are in no position to seek commercial or multilateral loans given that their annual revenues cover, on average, less than 60 percent of their operating cost.

Indicator 5: Water demand management and strategies to conserve water have had no comprehensive attention either by the MOEW or individual WEs. While its neighbours in the region suffer from a lack of water – some quite severe – Lebanon has not faced the same austere conditions which would make demand management as essential. Through donor programmes, the limited efforts in this area have supported some WEs with brochures, and school programmes on water use reduction or conservation – but there is not a comprehensive approach to the effort.

Summary of accountability reform

Indicators one and three are indicative of a utility that is customer-centric as opposed to the current situation where the customer is often left out of WE planning and operations. With international donor assistance, customer awareness and service is gradually shifting toward a customer-centric operation. Further momentum in this regard is essential for the image of the WEs and tariff collection to improve. Indicator two will assist in assessing customer perceptions that the WEs will need to address in order to improve their relationship with their customers. Indicator four is funda-

mental to becoming autonomous, and is included in accountability because fiscal autonomy is based in part on the WE's ability to fund capital and operations from its own revenues. In indicator five, donors have been assisting the WEs to develop demand management outreach programmes to reduce water consumption, but have barely begun to consider the role of demand management as part of water resources management.

Summary of framework application and utility reform in Lebanon

Using the framework for devolution presented above gives us a sketch or rough picture of the reform progress in Lebanon. The framework allows us to more comprehensively approach sector reforms, identify gaps in the reform effort, and plan and prioritize resource allocation. Using the illustrative indicators of the framework, Lebanon scores 27 out of 109 points, or approximately 25 percent. Users of the framework approach can change the illustrative indicators to match national priorities, and donors may use it to decide where to invest their limited funds.

The Lebanon Ministry of Energy and Water has taken substantial steps over the last three years to improve water and wastewater services through the passage of the National Water Sector Strategy (2010) and the National Strategy for the Wastewater Sector, as well as Ministerial decisions on water and wastewater tariffs. MOEW is also assisting WEs by providing funds to expand customer metering.

Applying the framework to Lebanon demonstrates the progress of the two national strategies and facilitates an illustrative comparison reflecting contemporary utility practices by the best utilities in other countries. As the strategies themselves indicate, reforming the WEs and MOEW to improve the management of water and wastewater services will take several years to fund and implement. The strategies are capital-

focused, but do not ignore the needed institutional and administrative decentralization steps for sustainable operations. The current progress is attributable to the Ministerial leadership, but may be weakened if that leadership changes after pending elections and possible shuffle of the government. ●

Notes

¹ These definitions are taken from *Government Decentralization in the 21st Century*, Center for Strategic and International Studies (CSIS), Stacy White, December 2011.

² There is a close parallel between the process of consolidation of local governments and then decentralization of authority and responsibility that many countries have undertaken in the last 25 years. It is from this process of consolidation-decentralization that the framework presented in this paper is derived.

³ Law 221 actually created six regional utilities but the Litani Water Authority has been treated as a separate entity based on a watershed. The two Bekaa (North and South) Valley regional WEs were later combined into one, the Bekaa Valley Water Establishment.

⁴ Nearly two-thirds of the municipalities in the Bekaa Valley WE's service boundaries provide their own water supply and wastewater collection.

⁵ *National Water Sector Strategy (NWSS)*, Eng. Gebran Basil (Minister of MOEW), December 27, 2012; *Lebanon Government Resolution No. 2*, March 9, 2012; *National Strategy for the Wastewater Sector (NSWS)*, MOEW; *Lebanon Government Resolution No. 35*, October 17, 2012.

⁶ The USAID funded *Lebanon Water and Wastewater Sector Support (LWWSS)* programme attempted the negotiation of an agreement between three separate municipalities and the Bekaa WE only to have the initiative rebuffed by the municipalities. Additionally, the BWE acknowledged that it did not have the manpower or funding to take over the wastewater collection system and treatment plants.

⁷ The country-level sector information and monitoring system (SIMS) could be one such set of benchmarks. The ten indicators are: hours of service per day; water service coverage; complaints per 1000 connections; bill as a percentage of per capita GNI; bill collection rate; operations cost coverage ratio; staff per 1000 connections; staff training rate as measured in training per total working hours; average complaint response time; non-revenue water.

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This paper was presented at the IWA Regional Utility Management Conference: Improving Performance in Emerging Economies, held 13-15 May 2013 in Tirana, Albania.

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Smart water metering – reducing water use with integrated control

Smart water metering and the use of a smart water management system that provides detailed information on consumption and leakage to both the utility and consumers can help identify household leakage and reduce water use. **JIN CHUL JOO, HOSANG AHN, CHANG-HYUK AHN, KYUNG-ROK KO and HYUN-JE OH** discuss three smart metering case studies and how water metering will evolve in the future.

Water conservation is becoming increasingly significant as the world faces a reduction in available water resources, increase in demand and future threats from changes in climate patterns. According to the United Nations Environment Program (UNEP) (UNESCO, 2003) more than 2.8 billion people in 48 countries (40 being in Asia and Africa) will face water scarcity by 2025. By limiting the use of water or using water more efficiently through the installation of water-efficient appliances and flow restrictors, and recycling stormwater and greywater, water management can be improved and made sustainable.

Recently, new water distribution

systems with an information and net metering system (smart water grid) have been proposed. In a smart water grid delivering water from suppliers to consumers using two-way digital technology, smart water metering should be deployed to capture the consumption data, to bill the water consumption, to detect the leakage, and to reduce the water utility's

operation costs. Thus, in this study, key technology issues around deploying smart water meters / sensors in advanced metering infrastructure (AMI) will be discussed.

Smart water metering

Compared to the 'simple' method of measuring consumption and taking

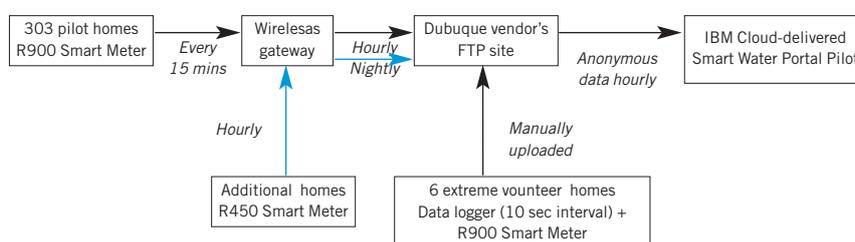


Figure 1: Data gathering flow of smart metering pilot studies in Dubuque (Adapted from IBM, 2011)

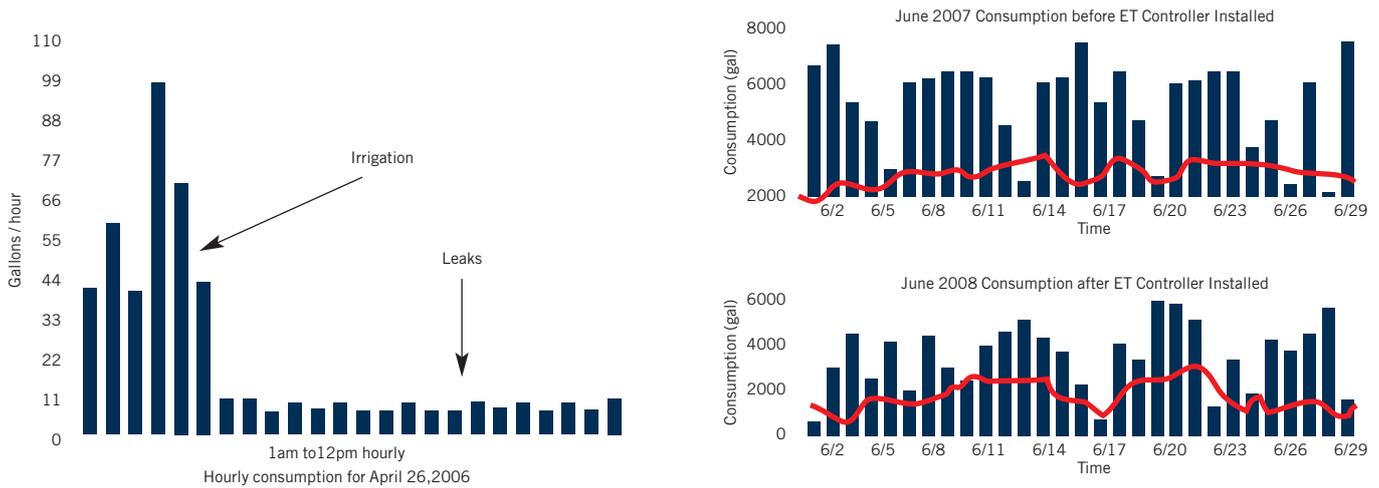


Figure 2: a) leak detection measured with smart water metering, and b) irrigation consumption before and after use of irrigation controllers in East Bay Municipal Utility District (EBMUD) (Adapted from Loeff and Fox, 2010)

manual readings, new systems employing the latest in communication capabilities and enhanced functionality have come to be known as ‘smart meters’. Conventional water meters monitor the volume of water passing through them without having an information and net metering system. However, smart meters quantify water use during a defined time interval, and record consumption data, demand and time of use (Herbert, 1999; Marvin et al., 1999; Stewart et al., 2010).

Generally, smart water metering consists of the meter (sensor), interface devices translating meter readings into transmitted data, a data-transmitting radio, a neighbourhood area network for data-receiving collection devices, and a wide area data collection network that transmits data to a central data centre (Loeff and Fox, 2010). Smart water meters should be accurate during the entire life of the meters, suitable for water with high levels of particulate matter, and able to undertake a wide range of measurements. Interface devices translating meter readings into electronic signals (so called encoders) should produce data with a very high resolution and function without an external power supply.

The AMI modules should communicate over a neighbourhood area network to a central data collection point, which then transmits data via a wide area network to the data centre (Loeff and Fox, 2010). AMI modules should also send signals to either a mobile data collection device or transmit to a fixed-network data collector. Finally, AMI systems should provide utilities with software that integrates the data into other utility systems (i.e., an integrated water management system). Thus, the software needs to have a central depot for data, to facilitate

the downloading of and access to AMI data by billing information systems, and for the reporting of leak alerts, consumption status, reverse flow and tamper alerts.

Case study 1 – role of smart water metering and portal

The smart water metering solution for the city of Dubuque in Iowa, US, used a cloud computing environment to collect, protect, and analyse consumption and time of use data. R900 smart water meters produced by the Neptune Technology Group were installed in 303 pilot homes, with the data gathering flow shown in Figure 1 (IBM, 2011). The R900 meter readings were transmitted from residents’ homes to a wireless gateway over a 900 MHz wireless communication band. The data was then stored on an FTP site and uploaded every four hours to the cloud. After that, the extraction, transformation, and loading process was performed to load data into the database.

Access to the smart water portal, which allowed users to receive leak alerts, let them monitor / analyse their own water usage, patterns and trends, compare their usage to that of others, and collaborate online via chat and weekly team-based contests, was given to 151 households in the pilot group. Water savings were measured by comparing and contrasting the consumption of these 151 pilot households with a control group of 152 households using identical smart meters, but without access to the insights provided by the water portal (see details in IBM, 2011). After eight weeks there was a one week break before the second phase of the pilot allowed the control group access to the water portal as well.

Based on the consumption analysis

results, an estimated total of 89,090 gallons (338,542 litres) of water over a nine-week period were conserved; an average saving of 6.6% per household. Pilot participants reported leaks at a rate of 8% compared to 0.98% city-wide. It is estimated that 30% of households on average have leaks. The water portal increased participants’ understanding of their water use and saving and 79% of water portal users made some kind of change to their water appliances or the ways they used water. This information led to changes in behaviour, such as fixing leaks, running dishwashers and washers only with full loads, and contemplating the purchase of more water efficient appliances.

Case study 2 – application to leak detection and irrigation systems

Although East Bay Municipal Utility District (EBMUD) in California, US, has not fully deployed the smart water management system which will be associated with 385,000 endpoints in its service territory, the rigorous pilot tests for both a fixed network and mobile meter readings have been performed to evaluate water savings by detecting plumbing leaks and by monitoring poorly-timed irrigation systems (Loeff and Fox, 2010). After analysing hourly meter data from 1000 homes, 32% of homes were found to have a continuous leak and 40% were found to have intermittent leaks (see Figure 2a). Also, more than 70% of homes watered their gardens daily, and 13% watered twice per day.

Similar to the IBM case study, customers can access monthly, daily, and hourly water usage in terms of dollars and gallons, and both leak alerts and water budget reports have been provided.

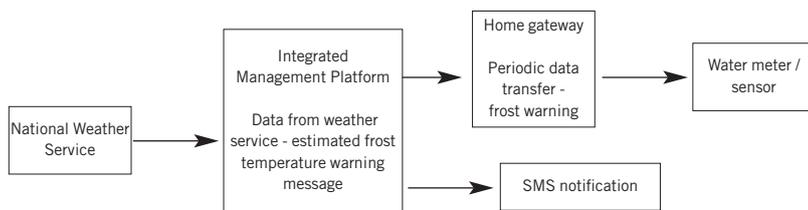


Figure 3: Additional services associated with smart water metering in advanced metering infrastructure (AMI) for Incheon City, Republic of Korea (Adapted from Hong et al. 2010).

In this study, smart water meters with AMI systems were found not to register consumption data less than 1.25 gallons (4.75 litres) per minute, and a 25% difference between the volume of water supplied and volume of water measured was seen, indicating that 25% of treated water was not being billed. However, smart water meters with irrigation controllers, which serve as an indicator of how much water plants need at any given time, increased water savings significantly. As shown in Figure 2b, irrigation water usage decreased below 6000 gallons/d (22,800 litres/d) compared to an initial level of 8000 gallons/d (30,400 litres/d). Thus, smart water meters with AMI systems can be used to detect water leakage, to bill exact water consumption, and to control irrigation systems in an effective way.

Case study 3 – application to additional services

A pilot project using a smart water management system and 300 smart water meters was undertaken in Incheon City in the Republic of Korea (Hong et al. 2010). A combined water meter and sensor (measuring electrical conductivity and temperature) were developed and installed in residential and commercial areas to evaluate a billing system and additional services (e.g., leak detect, frost alarm, elderly care, burglar alarm, etc.) (Figure 3). Existing mechanical water meters can easily be replaced with the newly-developed smart water meter and sensor, and the reduced circuit and low-power design allows the combined water meter and sensor to quantify the flow rate, measure the electrical conductivity, and detect any leakage.

From this pilot test, the combined water meter and sensor with AMI system successfully registered consumption data and transferred the data to management offices in apartment complexes and the water authority. The monthly, daily, and hourly water usage and real time bill were provided to customers and water authority via mobile and web portal. Other information such as a frost alarm, elderly care, leak detection, and burglar alarm were also linked to the system. The pilot test was performed in only two apartment complexes with 300 endpoints and the communications network over a neighbourhood area network (NAN) to a central data collection point was only evaluated with fixed-network water metering. Thus, changes in network topologies, the path flexibility of mesh networks, and the lifetime of batteries within AMI systems should be evaluated city-wide or nation-wide in the future.

Challenges and conclusions

The implementation of smart water metering means that maintenance staff will have to be well trained in electronics and technology, in addition to the traditional skills. Economically, although smart water meters have no direct payback period, the water usage data can prevent water and energy from pouring down the sewer. Not only can precious water be saved, but the loss of valuable heat energy and expensive chemicals that may have been used during water treatment can also be reduced. The challenge, however, is to educate water users about the benefits of smart metering and encourage its use.

As can be seen in the above case studies, smart water metering plays an

important role in an integrated water conservation system by helping identify the large water users, leading to greater understanding of water usage details and helping to monitor the success of implementing any water conservation measure. Although the cost was the top concern regarding smart water metering in AMI, smart water metering is a powerful tool for the optimisation of water supply, optimisation of operation of water facilities, and optimisation of water use efficiency. Recent developments in smart water meters indicate that smart water meters in an AMI become a two-way communications network that can receive and send information between the utility and its metered endpoints. ●

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Using a Financial and Operational Performance Improvement Programme as a tool for achieving sustainability

A Financial and Operational Performance Improvement Programme (FOPIP) can be used to improve a utility's performance and capacity to sustain that performance by identifying gaps in operational capacity and using key performance indicators to address issues such as non-revenue water, tariffs and management structure. **BRANKO VUČIJAK** and **GIEL VERBEECK** discuss the use of a FOPIP to specifically address common operational deficiencies in south east European utilities, as a step towards improving services and meeting loan requirements.

International Financial Institutions (IFIs) like the World Bank or regional development banks are often petitioned for a loan by water supply utilities that have weaknesses in their operations. That means that IFIs are facing a choice of rejecting such utilities or taking a risk that the loan would not be efficiently used, would not secure sustainable development, and finally might not even be repaid.

That is the reason that as a first risk mitigation measure an IFI usually insists on signing a loan agreement with some level of public administration, typically with the municipality as the owner of the water utility in transition countries, or with some higher level of the country administration, up to the state level. Such a contract would secure a loan repayment even if the direct beneficiary, the water supply utility, would not be able to pay



Use of flow measurement device. Credit: Hydro Engineering Institute Sarajevo

back the loan. The municipality or other public administration representative would then take over that responsibility. Such an approach also aligns the interests of the (local, county or national) government with those of the utility.

However, such IFIs are not ordinary banks and their main objective is not to make a profit, but to support the development of different areas. Thus, a simple loan repayment cannot be the only objective and the primary goal should be securing the operationally and financially sustainable development of a water supply service. This is the basis of IFIs' frequent requests that the utility, before or during the implementation of the loan, also implements its own capacity building programme, aimed primarily at the improvement of the utility's operational efficiency and financial management. Such a programme strengthens the utility's capacity to effectively provide high quality water and sewerage services in a financially viable way, and increases the likelihood of the utility fulfilling its debt service obligations. This is known as a Financial and Operational Performance Improvement Program or FOPIP.

FOPIP components

A FOPIP aims to raise the capacity of the utility in specific areas. The first task of the consultant is to make a thorough review of the utility's present operations, including operational, financial and environmental management, organizational structure and staffing, legal set-up and internal regulations, procedures for tariff setting and planning, information dissemination and raising public awareness, amongst others.

So which of the above mentioned areas often present key gaps in utilities' opera-



Giel Verbeeck



Branko Vučijak

tional capacity, leading to unsustainable operation? What are the key performance indicators (KPIs) that could be used to evaluate the quality of a utility's service? Below are more details on the authors' experiences regarding the most frequent gaps in capacity and KPIs that should be addressed.

Non-revenue water

The indicator for this aspect of performance captures the extent to which the utility has maintained its network, reduced illegal connections and controlled legal but unbilled service connections. The majority of south east European (SEE) utilities when asked to name the first key operational issue that they have would say a high non-revenue water (NRW) level and a low tariff. SEE utilities rarely have in place any consistent strategy or policy regarding NRW management, with usually only passive leakage control measures in place, such as the identification of physical losses based on complaints from consumers who have observed a problem in the system – e.g. insufficient pressure, cessation of the supply or spotting a leak. The utility staff also report problems if they are observed during other missions. There are no systematic actions aimed at detecting physical losses, e.g. water balance calcula-

tions, flow and pressure measurement campaigns, leak detection campaigns, etc.

These utilities rarely systematically monitor any NRW operational performance indicators. Only NRW as a percentage of the total production volume is periodically calculated or more often roughly estimated. This estimate, however, is not used to observe the trends, to benchmark the performance or to take appropriate action and manage NRW. Separate district metered areas (DMAs) are rarely established and monitored and there are usually no bulk water meters at water sources or within the network.

It is probably the lack of funding which is the key reason for such situations, since reducing leaks requires funds for maintenance and for leak identification, which implies either tariff increases or additional government funding, neither of which may appeal to politicians. Also, leak reduction is less politically visible than the extension of the network and making new connections, which are clearly seen as benefiting potential voters. Reducing commercial losses (theft) raises further issues requiring community involvement and changing a culture that views illegal hook-ups as acceptable, despite the fact that revenue burdens are passed on to others (Berg, 2013).

Useful KPIs that define the value of water losses (according to IWA) and should be addressed are (Čapljin FOPIP & Danilovgrad FOPIP, 2013):

- Apparent losses with regard to the authorized consumption, defined as a percentage in proportion to the volume of water supplied on annual level
- Litres (of apparent losses) per connection per day
- Litres (of real losses) per connection per day
- Litres (of real losses) per connection per meter of pressure
- m³ (of real losses) per km of pipeline per day
- UARL – Unavoidable Annual Real Losses. This indicator is issued by IWA and AWWA and is defined as being a theoretical reference value representing the lowest possible technical level of water leakage from a pipeline which it is possible to reach by using best available technologies. UARL is calculated based on the following formula:

$$UARL = (18 \times L_m + 0.8 \times N_c + 25 \times L_p) \times P \quad (l/day)$$

where L_m represents network pipeline

length (km), N_c is the total number of connections in the system, L_p is the total length of service connection pipes passing through the private property (km), and P the average pressure value in the system (m).

- CARL – Current Annual Real Losses. This represents the total annual volume of water being lost through all physical defects in the system, detected or undetected, or due to mistakes made by the operator (e.g. reservoir overflows).
- ILI – Infrastructure Leakage Index. ILI represents an indicator defining the quality of water system operation (maintenance, repairs, rehabilitation) needed for real loss (leakage) control. It mathematically represents a ratio between CARL and UARL. A low ILI indicates that the water utility has managed to reduce system leakages to the UARL level or to the theoretical low limit which could be reached (≥ 1). Since ILI is a non-dimensional indicator, it represents a leading indicator for the benchmarking of leakage with other utilities worldwide. In that sense ILI is a superior indicator, although it is harder to monitor than for instance NRW as a % of total system input.

Tariff policy and collection

Utilities usually have a tariff system with different water and wastewater tariff rates per m³ for different categories of customers (i.e. households and public institutions, organisations, companies), based on drinking water supplied. Tariffs are applied based on metered water consumption. The wastewater tariff is applied based on the quantity of drinking water invoiced.

In most SEE countries there is the common practice of applying discriminative pricing in favour of households. As a legacy from the past, industry and institutions are supposed to subsidize household consumption. Although the average water tariff is set below full cost recovery, some of the revenues of the water sector are still used to cross subsidize other municipal services provided by the same utility (in smaller municipalities often the same utility is responsible for water supply, sewerage, solid waste management, parks, parking management, district heating and other local services). This can happen because part of the tariff covers the non-cash expense of depreciation. Other expenses, such as for investment maintenance and water meters, are delayed or not incurred at all.



Installation of sound monitoring devices.

Credit: Hydro Engineering Institute Sarajevo

Affordability analysis is rarely made use of, thus preventing the effective application of social considerations, which are replaced by political considerations and influence that often prevents full cost recovery. Politicians often do not want to tackle the politically-sensitive issue of water non-payment and theft (part of NRW). Some government agencies may not pay their water bills, arguing that the money all comes from the same source and their budgets are limited (Berg, 2013).

KPIs in this area that should be assessed could be (Čapljin FOPIP & Danilovgrad FOPIP, 2013):

- Is appropriate full cost recovery tariff calculation for drinking water and sewage services applied and does it take into account affordability?
- Are there any cross subsidies implemented in the utility, between different services or different type of consumers?
- Is there a documented methodology and agreed mechanism in place to achieve tariff adjustment?
- Current ratio, a ratio of current assets to current liabilities during the 12 months preceding the date of calculation
- DSCR, a debt service cover ratio calculated as EBITDA (earnings before interest, tax paid, depreciation and amortisation) minus tax paid, plus / minus the change in working capital minus capital expenditure during the 12 months preceding the date of calculation, to the sum of the principal repayments and interest payments on all debt due or accrued during the period
- A revenue collection rate

- A ratio of an aggregate amount paid to the utility for services rendered to customers either in cash or offset against payments due from public utility companies during the fiscal year to an aggregate amount billed to customers for the same services during such period
- Overdue invoices of accounts receivable in the present year

Organization structure and staffing

Utility managers do not have the incentive to reduce the work force and cut labour costs, since there is seldom any reward to achieving those savings (quite the opposite, as since it would increase local employment there is pressure from the municipal administration to employ more staff). Many view local communal enterprises as a kind of 'last resort' employer. In addition, politicians often want some level of control over the jobs available in utilities, which are used to reward faithful party members and / or to gain support of key labour leaders. Politicians often want to place those who would promote their political agendas into positions of authority within utilities (Berg, 2013).

If an employee is working only for one department of a utility, which is responsible for single service provision (i.e. water supply), there are no records kept for the time spent on particular services so the extent of their work cannot be quantified. This is one of the key obstacles for proper tariff calculation based on full costs recovery, since the costs are not clearly separated.

The average organizational structure has a rather rigid and static approach regarding the management of a utility – 'everybody has a defined job and if everyone does that it should be fine'. In reality the performance of a utility depends on the coordinated efforts of human beings, each one with different competences, skills and responsibilities. In existing structures there are often islands of responsibilities and reporting lines are not clear. A more simple structure, based on teams rather than professions, would be easier to follow.

Since all assets, human resources, revenues and costs are most frequently jointly held there is no distinction between external (so called productive) and internal services (overhead and other). As a consequence the analysis of the costs of a particular service is complicated. In the case that funds are lacking

one cannot say whether this is caused by:

- Too low tariff for a particular service
- Too high direct costs for a particular service
- Too high indirect costs

There is an obvious need to include cost centres for all external and internal services of the company. Through the allocation of indirect (internal) costs to those for the productive services the full cost of service will become visible for each service that the utility provides.

Key performance indicators in this area that should be assessed are (Čaplina FOPIP, Danilovgrad FOPIP & Kruševac FOPIP, 2013):

- Number of employees in the utility responsible for water supply and sewerage services per 1000 connections
- Number of employees in the utility responsible for water supply and sewerage services per 1000 consumers
- Are the cost centres in place, based on established organizational structure and services provided?
- Is there allocation of indirect costs in place?

Accounting and management information system

The initial analysis of the accounting and budgeting management procedures should include at minimum a brief review of the type of accounting documents in use by the utility and whether a cost coding / cost accounting system exists, a review of individual responsibilities of the staff regarding the production, processing and authorization of accounting documents, and a review of the accounting software used and its functions. Quite often problems in the organization and processing of data in a company come from the unclear and not fully defined organizational structure. This is reflected in undefined or improperly defined and used cost centres, so as a lack of budgeting at lower levels of operation. Frequently there is a clear need for the development of more detailed and tailored chart of accounts. Financial reporting is in most cases implemented only to meet legally prescribed obligations and at the level of the whole utility, very rarely is it applied at a lower level cost centre or organizational unit and used as a management tool.

Management Information Systems (MIS) are distinct from other information systems in that they should provide information needed for the efficient

management of a utility, enabling informed operational or strategic decisions. Its objective is to design and to implement procedures and routines leading to the provision of detailed information or reports in an accurate, consistent and timely manner. Formerly, MIS was based primarily on the accounting data and provided only simple operations such as tracking billing and invoicing, and the collection of payroll data, but over time managers started demanding much more detail, with the aim of creating more in-depth management reports from the raw data. Such an attitude is lacking in the majority of SEE utilities.

KPIs in the accounting area that should be assessed are (Čaplina FOPIP & Danilovgrad FOPIP, 2013):

- Are accounting procedures in line with the International Financial Reporting Standards and national legal regulations?
- Are cost centres clearly defined and introduced?
- Are costs and revenues recorded at the lowest level of defined cost centres?
- Is reporting implemented at the service level of cost centres as well as for water supply and wastewater services?
- Is accounting (also) used as a tool for efficient management?
- Are all requested accounting documents / regulations to be prepared by the utility adopted and implemented?
- Is its chart of accounts tailored for the specific utility's needs?
- Is there a basic MIS in place, including a selection of KPIs that are monitored regularly? KPIs should include financial, operational and customer service indicators (e.g. indicators on NRW as described above, unit operating cost per m³ sold for water operations, energy costs as a proportion of direct operating costs for water operations, cumulative collection rate, current collection rate, number of water pipe breaks per km, number of water pipe breaks per connections, and others)
- Are all indirect costs separately accounted and distributed to the individual services?

Budgeting and business planning

Apart from a tariff evaluation, SEE utilities on average do not prepare any financial forecasts. There is neither a cycle of annual budgeting nor do they maintain a budget that is compared to actual expenses.

Still, the implementation of the cost centre-based accounting system precedes the implementation of budgets at the cost centre level. Senior staff rarely have experience of a (decentralised or consolidated) budget, so any such implementation should therefore wait until the reports from the cost centre-based accounting system are systematically produced and managers start to identify with 'their' direct and indirect costs. In addition there is also a need for a consolidated budget, which may be prepared on the basis of the individual cost centre budgets.

At present in the majority of SEE utilities there is no business plan that is systematically drawn up on an annual basis. The management is rarely familiar with the steps, procedures and analysis required for business planning.

KPIs in the budgeting and business planning area that should be assessed are (Capljina FOPIP & Danilovgrad FOPIP, 2013):

- Is there operational budget and cash flow projection in place per cost centre and on consolidated basis?
- Is there at least a basic capital investments budget module in place?
- Is business plan prepared and updated regularly?

Consumer relations

Most larger utilities in EU, and even more recently in transition countries, have a dedicated official responsible for customer queries, but also for actively obtaining valuable feedback from customers. SEE utilities often do not have such a person and therefore the responsibilities for customer affairs are somewhat scattered throughout the utility or even neglected. That means that written complaints are filed first with the defined first step responder, after which a manager decides what to do and who would follow up. Verbal complaints are usually dealt with by whoever is available in the administration or technical department, or even with the person that accidentally received the call. Thus there is actually no incentive to ensure that the problem is really solved and the customer depends on the goodwill of individual staff members. What is just as important is that customer feedback is not collected, analysed or used for improving performance.

Consumer relations do not necessarily have to be someone's sole responsibility. Particularly in smaller utilities these

officers may combine their responsibilities with reporting and performance monitoring, awareness raising and / or public relations. All of these require a particular set of skills that is sometimes difficult to find in smaller communities: analytical, service and customer oriented, computer literate, communicative, etc. That person should have the access, means and place in the organization to be effective.

KPIs in the customer relation area that should be assessed are (Capljina FOPIP, 2013):

- Is there trained and put in position the customer service officer?
- Is he / she addressing all individual queries and complaints?
- Is there a monitoring and analysis of the development of customer service activities in place?
- Is the customer service officer actively collecting feedback from customers to follow up for performance improvement?

Conclusions

This paper only covers the major and most frequent areas within SEE water supply utilities that need improvement. This list is not exhaustive and may be complemented, i.e. with the level of operational autonomy of the utility, bill collection procedures and achieved collection rate, an effective metering programme (which may be also considered as part of NRW management), a billing cycle, a purchasing, inventory and fixed assets cycle, infrastructure ownership and depreciation, a public service agreement and its content, etc.

FOPIP is primarily an instrument that complements a loan or a grant. Managers and authorities need to accept the instrument as a condition for receiving the loan or a grant, whether they welcome the intervention or not. This is unfortunate and detrimental to the FOPIP. A successfully implemented FOPIP is highly beneficial to all stakeholders, the utility management, the municipality, utility staff and customers. Even other utilities may benefit from the example of better performance and the sharing of experiences and best practices.

The success of the FOPIP depends critically on:

- The quality of the consultant. This includes, in particular, its leadership and authority as an expert. The FOPIP is an interactive process, and it is tailoring to the local situation rather than experi-

ence which is what makes it successful.

- The amount of man hours. More input does not necessarily mean better results. However, each objective requires a minimum number of man hours.
- The optimal mix of international and regional expertise
- The quality of the terms of reference (ToR). The principle of garbage in, garbage out is very applicable here. ToR aiming to achieve vague or unrealistic / undesirable goals generate poor results. On the other hand, a balanced and focused ToR that still leaves some discretion to the consultant provides the FOPIP with a head start. The ToR should be optimized for the type of utility, its size, geography, level of sophistication, specific problems, culture, technology, etc.
- The attitude of the utility and the municipality, in particular the utility's management. Each FOPIP consultant will need to overcome some initial scepticism with respect to the prospects for real change. If the biggest obstacle to change is the management itself then the FOPIP instrument will be ineffective. Other interventions would therefore need to be considered (management contract, lease or more targeted forms of technical assistance focusing on specific aspects of operations).
- The mix of available resources for the development of the FOPIP action plan and its subsequent implementation. Most important is that the scope of the plan must be consistent with the available resources for implementation.

If the conditions for success exist, then a FOPIP can have a lasting benefit on a community and should be welcomed. Unfortunately, FOPIPs are often financed from grants that come with strings, i.e. eligibility criteria. Performance related payment is difficult to implement since the FOPIP consultant does not assume management responsibility and therefore cannot be held accountable for results in this way. However, at the beginning of the FOPIP the action plan is developed by the consultant. In the action plan the actions and responsibilities are defined that include those for management, consultant and municipality. The consultant would have an incentive to commit itself to results if the contract for implementation is not automatically granted. Instead, it could be in the form of a

contract extension. This would leave the grantor with the option to tender the implementation of the action plan to a third party. The incumbent consultant, having invested in obtaining hands-on knowledge, is well positioned to win the implementation contract. In this way, to secure the rewards of the investment in the form of contract extension, the consultant has an incentive to include some extra results in the action plan, for which it would take responsibility. ●

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This paper was presented at the IWA Regional Utility Management Conference: Improving Performance in Emerging Economies, held 13-15 May 2013 in Tirana, Albania.

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INVESTMENT

Encouraging Western Balkan investment with the Municipal Infrastructure Development Fund

Given the backlog of infrastructure investments across the Western Balkans, the new Municipal Infrastructure Development Fund has been developed to help release funding for the sector.

CHRISTIAN HAAS, of the KfW development bank, explains how the Fund will work.

There is a significant backlog of investments across all municipal infrastructure sub-sectors in the Western Balkans, including water, wastewater, district heating, urban transport and municipal roads. A number of municipalities, particularly those that are small to medium sized, cannot attract the financing they need from the commercial banking sector due to a lack of capacity to be able to prepare suitable projects and a limited appetite among the commercial banks to take on municipal risk.

Reaching out to more municipalities in the Western Balkans requires the development of a new, dedicated instrument with a mandate to improve the long-term sustainability of municipal services and transition impact in these markets. The instrument has to also develop a commercial banking market for municipal lending by improving the ability of the commercial banks to analyse and take on municipal risk.

To achieve these aims, the European Bank for Reconstruction and Development (EBRD) and the German development bank KfW decided to

set up the Municipal Infrastructure Development Fund (MIDF) to facilitate additional financing from local banks to municipalities and utility companies in the Western Balkans.

Mission and objectives

MIDF's mission is to deepen and broaden the local financial systems and to enhance local self-government in the Western Balkans. This will be achieved by developing the capacity of local banks to undertake municipal lending and by improving the efficiency and sustainability of municipal infrastructure.

The fund will facilitate the use of commercial practices in financing and providing infrastructure services in several ways:

- By covering part of the risk of private commercial banks that finance municipal infrastructure projects
- By building commercial banks' capacity to analyse municipal risk
- By involving private management in the management of the fund
- By providing access to commercial banks for municipalities and utilities that have no history of borrowing for investment projects

- By supporting financial reforms at the municipal level (utility tariff reform, improvement of collection rates and so on)

The sustainability of municipal infrastructure investments will be ensured by providing suitable financial instruments combined with the necessary technical assistance, which will be instrumental in achieving transition goals in the Western Balkans.

Financial volume and investment partners

It is intended that MIDF will reach a total volume of €100 million (\$133.6 million). Besides the planned commitments from EBRD and KfW, the governments of Austria, Germany and Switzerland have also committed financial support for the fund. Another IFI was also due to participate in the first closing, which was scheduled for July 2013.

Overall structure of MIDF

MIDF has been established as a structured investment fund based in Luxembourg that issues shares at regular intervals and closings, in line with the development of the fund's activity.

MIDF may issue three different classes of shares, with different levels of subordination, different returns and different maturities in the following categories: First loss Junior C Shares; Second loss Mezzanine B Shares; Senior A Shares. An overview of the structure is given in Figure 1.

These three categories of shares will allow the shareholders to participate in the governance of the fund. The leverage described is one of the key characteristics of MIDF's structure. By establishing various risk tranches corresponding to different return and risk profiles, MIDF will leverage public and donor funds invested in Junior C Shares by investments in Mezzanine B Shares and Senior A Shares. The base currency of the fund will be the Euro, as MIDF investments will be in countries with close ties to the currency.

Investment strategy

MIDF does not intend to compete with or displace local commercial banks. It will expand the municipal credit market by working with municipalities that have difficulty in preparing bankable projects and mobilising funds for their investment projects. It will also work with the commercial banks to build their capacity to evaluate and take on municipal risk.

In more advanced markets, where commercial banks have already developed a municipal lending business of their own, MIDF will adopt a 'subsidiary' approach to complement the commercial bank market as needed, and ensure that the market is not distorted. Therefore, the fund's modus operandi is as described below.

Push strategy

This will be adopted for Albania, Montenegro, Macedonia, Bosnia and Herzegovina and Kosovo, which have less developed credit markets for municipalities. Here, the fund will provide loans to municipalities / utilities channelled through local partner banks. The fund will share a substantial part of the risk of the municipal borrowers defaulting, providing an incentive for banks to consider infrastructure projects that might not have been financed if the local banks had to take on the full amount of risk. The fund's focus will be on this group of countries, which clearly need support to develop their municipal credit market.

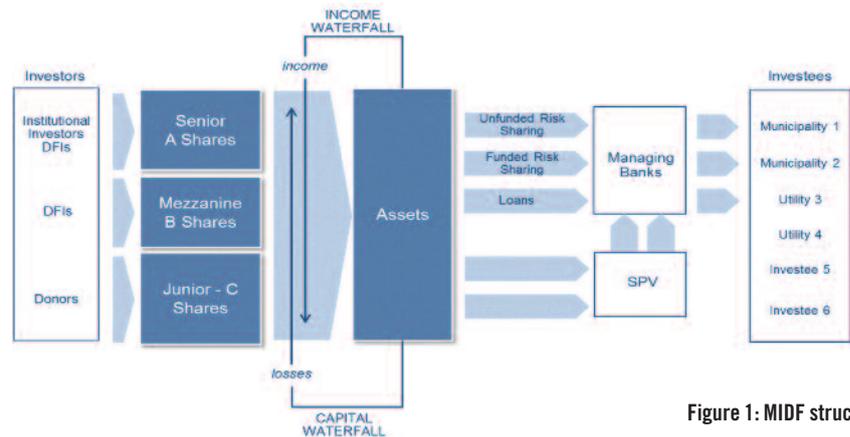


Figure 1: MIDF structure

Pull strategy

This will be adopted for Serbia, where the commercial bank market is more advanced. Here, the fund will stand ready to offer credit lines to commercial banks. These credit lines will be at market price and with no risk-sharing features. In this way, the already advanced commercial lending market will not be distorted and the commercial banks will take on the full risk of the municipalities or utility companies.

Financial products and services offered by MIDF

The fund will invest through participating banks that have entered into participation agreements with the fund. The fund will provide financial support to the participating banks by way of funded or unfunded risk participating agreements (RPAs) or credit lines.

All loans extended or secured by MIDF will be in the form of senior loans. The eligible projects to be financed by MIDF are expected to have a minimum loan size of €100,000 (\$133,600) and a maximum of €5 million (\$6.7 million).

MIDF will also offer technical assistance (TA) through qualified international consultants for both the participating banks and the ultimate borrowers (for instance, municipalities or utilities). TA for the banks will focus on establishing systems and procedures for the proper assessment of municipal risk and infrastructure projects. TA for the municipalities and utilities will be mainly offered to support project preparation, presentation of financing proposals to the participating banks and providing limited support during project implementation.

Management of the fund

The management of MIDF's assets will be delegated by the board of directors to a professional investment management company that will manage the assets in accordance with investment guidelines

established by the board.

Typical investment manager duties include pre-selection of participating banks, recommendation of investments to the investment committee, negotiations of agreements with the participating banks once these have been approved by the investment committee, on-going monitoring of the institutions, and provision of regular reporting.

The investment manager will operate under the supervision of the investment committee, which will be appointed by the board of directors. The investment committee will approve fund investments and supervise the management of the fund. In particular, it will monitor the pipeline of investments, the portfolio of transactions, and the financial structure and performance of the portfolio and investments.

Next steps

The MIDF was established at the end of 2012. There have been information sessions for all banks that may be interested in working as participating banks for the fund. The investment manager will carry out due diligence of those banks that have been shortlisted by MIDF as potential participating banks, and in parallel the consultants carrying out the TA for the utilities and municipalities will start preparing potential infrastructure projects to be financed by the fund. It is expected that the first investments will be made by the end of 2013.

This paper was presented at the IWA Regional Utility Management Conference: Improving Performance in Emerging Economies, held 13-15 May 2013 in Tirana, Albania.

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Improving Balkan water and wastewater utility performance through incentives

There is a substantial requirement for investment in water infrastructure in the Balkan region, which is striving to achieve EU accession. **DIRK VALLERIEN** reports on the issues and potential solutions.



There is an immense need for investment and improved performance in the Balkan water and wastewater sector. The water supply and wastewater infrastructure in the region has deteriorated significantly, and wastewater treatment plant coverage is still low.

The region's countries are looking towards EU accession, but the investment requirements in the water sector are daunting. The recently-published National Water Supply and Sewerage Masterplan for Albania (IC-igr, 2013) has identified a short-, medium- and long-term investment requirement of about €6.4 billion (\$8.5 billion) for Albania alone.

A study focusing on the Balkan region, prepared for a conference entitled 'Paving the way for accession and neighbourhood' (FMECD KfW, 2010) in 2010, estimated that the investment needed to achieve compliance with the European water and wastewater legislation came to between 11% and 52% of national GDPs, resulting in a total investment need of

about €15.4 billion (\$20.5 billion) for Albania, Bosnia and Herzegovina, Kosovo, Montenegro and Serbia, and nearly €48 billion (\$64 billion) for Turkey (COWI, 2010).

While a few water utility enterprises have already significantly increased their performance, and even achieved promising levels of sustainability, most of the decentralised providers of water and sewerage services are still far from covering their costs through customer tariffs as required by the European Water Framework Directive (EU, 2000).

In some of the region's countries, benchmarking projects and on-going benchmarking activities have successfully established transparency in this respect (DPUK, 2013). With some exceptions, the water sector is still generally characterised by limited hours of water supply, insufficient tariffs, insufficient collection efficiency and revenue levels that often do not cover operating costs. Subsidies are often provided from the national or municipal budget to cover operating costs.

According to a report from the Water Regulatory Authority of Albania (WRA, 2012), in 2011 customers were on average only supplied for 10.9 hours per day, and the sector average NRW was 63.5%. Only eight out of 56 Albanian water and sewerage utilities were in a position to cover their operation and maintenance costs.

Linking investment funding to utility performance

The concept

The basic approach for the sustainable operation of water supply and sewerage infrastructure is to link the provision of funding for investment to set levels of performance in running the water utility enterprise. The thinking is that in most cases a significant increase is necessary in order to arrive at the level required for permanent and sustainable operation. This is even more important where the construction of new or additional infrastructure such as wastewater treatment plants will result in significant additional operating costs.

Linking investment financing can be achieved by creating several investment phases. Commitments for the subsequent investment stages will only be made if performance has significantly increased, so additional investments can be sustainable. In addition it is also possible to define performance thresholds in advance for clearly defined indicators that have to be fulfilled before the first investment is implemented.

This approach has competition as a core element. Water utilities compete to achieve the target values for pre-defined performance indicators. Implementation through the 'first come, first served' principle selects and rewards the best-performing utilities. Limited funding

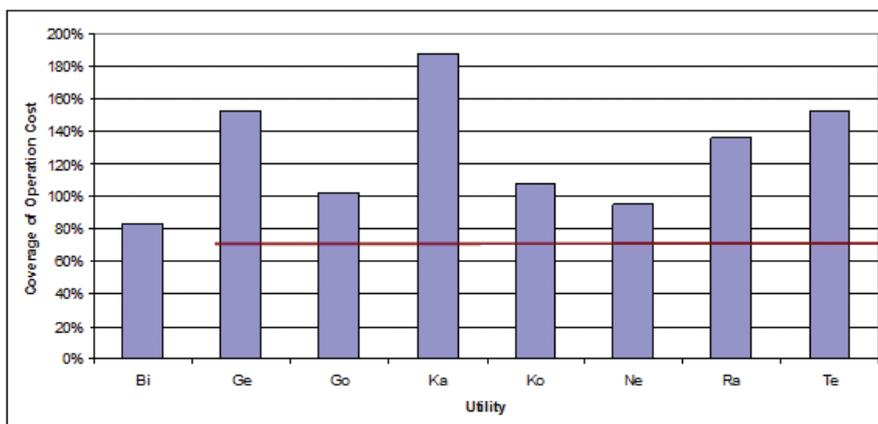


Figure 1: Percentage of operating costs covered by revenues collected from water sales for eight water utilities in the Former Yugoslavian Republic of Macedonia participating in a performance based investment programme (Haskoning, 2013)

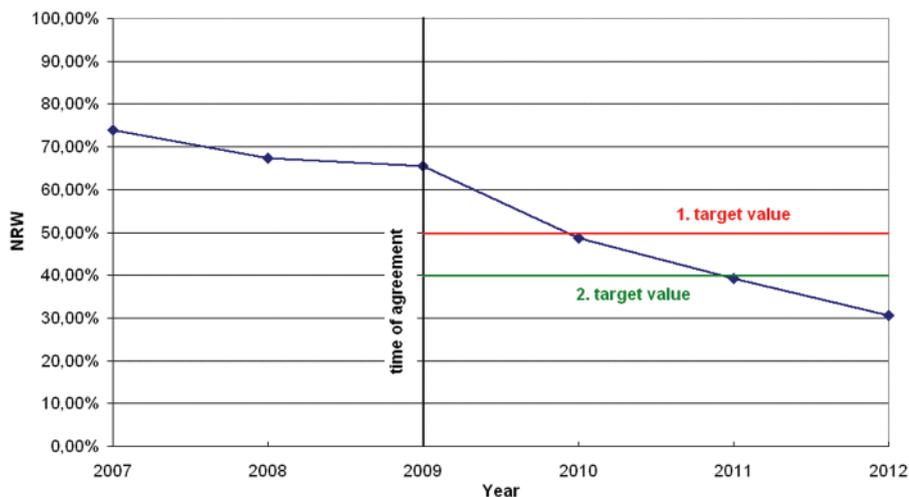


Figure 2: Reduction of NRW in Pogradec, Albania (SETEC, 2012).

results in the utilities working to achieve the target values as quickly as possible.

While some people consider uniform thresholds for all water utilities to be fair, others observe that the starting positions and framework conditions might be very different for each utility and supply area. Given these considerations it is also possible to design tailor-made target values for performance indicators that take the varying conditions at individual utility enterprises into account.

The basic assumption of this methodology is that once significant improvements have been achieved and target values met, this demonstrates the commitment and willingness of the utility to change and improve. It is assumed that this approach will continue during investment implementation, so that sustainability can be achieved after the facilities begin operation. Early investment can increase the acceptance of necessary changes at utility and customer level. The risk of not meeting the target can be mitigated through the inclusion of additional milestones that have to be fulfilled for consecutive implementation stages. Institutional improvements and physical works can thus at least partially run in parallel.

Assistance during the transition process

Although the need for improved performance may be understood or accepted based on agreements, most water utilities do not understand exactly how to achieve the defined goals in time. They do not usually have a business plan to rely on, or a focus for implementation. Therefore, technical assistance from experienced institutional consultants has to support the massive process of transformation.

It is essential to identify core fields for intervention and to develop appropriate actions to ensure success in the water enterprises' business activities.

However, it must be stressed that the utility has to be in charge of the turn-around process. Part-time assistance means directors must take care of the necessary interventions and actions themselves. It goes without saying that political backing is also necessary. Finally, it helps to initiate technical assistance as early as possible to ensure performance targets are met, and to accelerate implementation of the physical investments.

Different models implemented in the Balkans

In recent years, various performance-based water sector investment projects have been implemented in the Balkans. While the first decisions for funding subsequent investment stages were made when the results from previous investment stages were achieved, more sophisticated models have been developed over the years.

Based on its experience and independent evaluation of the results of projects or project phases, the German development bank KfW now prefers this approach for most of the region's projects when implementing funds provided by the German government, other donors or through its own financial means. The various models implemented or under implementation in Serbia, Macedonia and Albania are described below.

Serbia

The first performance-based investment programme in the water sector was launched in 2006 (KfW, 2006), designed

for the water supply and sewerage utilities of medium-sized municipalities. A core element of the approach is competition among these water utilities. In the first stage all municipalities that committed to a minimum level of institutional reform received technical assistance and institutional support, though the amount of investment was limited.

Investments focused first of all on small repairs, replacements and operational equipment. For all water enterprises, uniform target values were defined for a number of selected performance indicators. These included utility performance indicators such as customer billing, a minimum collection efficiency of 80% and for the utility to cover operating costs, including maintenance, repairs and debt servicing.

A further condition for the municipalities was that they must pay their own water bills and set up and follow a tariff adjustment plan. Increased investment funds were only available for those water utilities that fulfilled the target values on a given date and that committed themselves to additional performance improvements on the basis of tariff adjustment plans.

Today, five phases of the performance-based investment programme are either under implementation or in preparation in Serbia. Most of the public utility companies that participated in the programmes by committing themselves to the principles and to improvements in performance and financial sustainability have qualified for the investment stage.

Macedonia

Macedonia has designed a similar performance-based investment programme to that drawn up in Serbia, which is under implementation. Eight municipalities are participating in the programme.

Some 400,000 inhabitants live in the supply areas in question. During phase one the water utility enterprises receive support from an institutional consultant to prepare and qualify for phase two, which contains further investments. A minimum of four public water utility companies must achieve the pre-defined phase 1 indicators.

12 performance indicators and target values have been defined, which have to be met before phase two funding. These include a collection ratio of at least 60% and full coverage of operating costs, maintenance and reinvestment, and

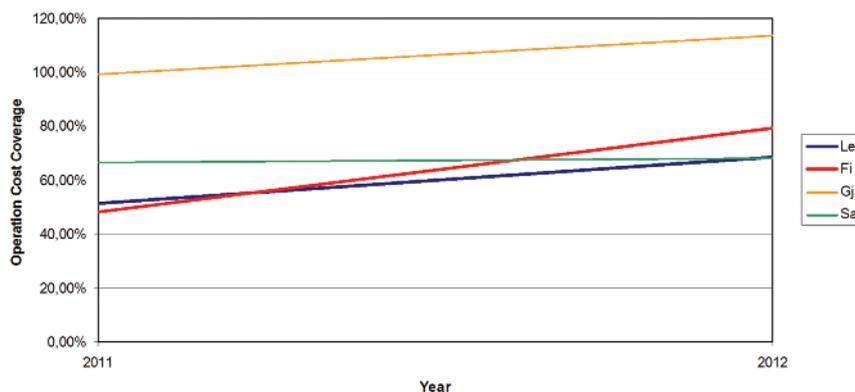


Figure 3: Performance increase of water utilities in Albania, participating in municipal infrastructure programme I (SETEC, 2013).

servicing debt through revenues collected from water sales.

In the meantime most of the participating water and sewerage utilities (currently six out of eight) have achieved revenue levels that cover their respective operating costs including maintenance and servicing debt.

Albania

In Pogradec two phases of investment in water supply and wastewater disposal (a sewer network and wastewater treatment plant) have been completed with financial support from the German and Swiss governments. However, while the level of cost coverage has been increased sufficiently, non-revenue water (NRW) was still at an unacceptable level of about 65% percent in 2009. Therefore, an agreement was made in July 2009, linking the implementation of a third investment stage to reducing NRW. Target values were defined as pre-conditions before contracting the implementation consultant (a NRW of less than 50%) and before tendering the works and supplies (a NRW of less than 40%). The milestones have been achieved by Pogradec in time, so the project can be implemented without any delay.

In Albania there are currently two performance-based water sector investment programmes being implemented (Municipal Investment Programmes I and II), which focus on different locations.

Further programmes (Municipal Investment Programmes III and IV) are being prepared, which are also designed so that increases in performance have to be achieved as a pre-condition for investments. Here, fulfilling three set milestones results respectively in the consultant starting work, the tendering of works and

supplies, and the award of supply and works contracts. An experienced institutional consultant, who divides his time between each of the participating utilities, is providing support.

As a result, the utilities have to achieve the required improvements by themselves, while receiving intermittent advice from the international consultant. In the ongoing programmes, cost coverage is the comprehensive performance indicator that is monitored and determines whether and when investments will follow.

The different starting positions and framework conditions have also been taken into account, resulting in individual target values for the various participating water utilities. All of them have to demonstrate their capability and willingness to make improvements to launch the consecutive implementation stages for investments. Within a comparatively short period of time, there have been significant improvements.

Despite all the challenges and risks during implementation, the results that have already been achieved are promising. The performance-based implementation of investment projects has contributed to improved performance among the participating water enterprises. This approach will be followed as far as possible within the future water sector investment stages, supported by funding from the German government and other donors.

Benefits of incentivising increased performance

Incentivising increased performance by linking it to investment funding has had a significant impact on the performance of Balkan water utilities, and thus also on the region's water sector as whole. On one hand the utilities themselves benefit from

increased performance by moving from a disaster management approach to becoming a stable service provider with an enhanced reputation. In addition they gain access to more funding sources for investment. Their customers also benefit from the improved service through better water quality, supply hours or service focus.

Higher collection efficiencies also create equal and fair treatment of all customers. Finally, central and local governments and donors that provide funding for water sector investments benefit from the improved sustainability of their investments, which creates a sound financial basis for appropriate and continuous operation of the water supply and wastewater facilities. ●

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This paper was presented at the IWA Regional Utility Management Conference: Improving Performance in Emerging Economies, held 13-15 May 2013 in Tirana, Albania.

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