
Community participation and sustainable investment in city projects: The Berlin Water Consumer Stock Ownership Plan

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Abstract Water supply issues and sustainable urban development are inextricably linked in cities across the world and are becoming even more urgent given the ever-increasing scale and nature of demand. As with many large cities across the world, Berlin is situated along a river, the Spree. What regularly causes massive fish death is not emission-intensive industries or citizens illegally disposing of waste. During heavy rainfall as the sewers threaten to become overburdened, the combined sewage system discharges its contents directly into the river to prevent an overflow into the streets. This problem is common to countless metropolitan regions. The measures implemented by the city of Berlin to date — underground concrete basins as buffers and an intelligent canal control system — remain insufficient to capture the 3–4 million cubic metres of untreated wastewater still discharged into the river each year. LURITEC, a new system of pre-manufactured, modular synthetic glass fibre tubes that are placed in the river instead of underground, can make a cost-efficient contribution towards closing this gap. The system is complementary to traditional concrete tanks. Two major obstacles have so far hindered implementation of the €60m LURITEC pilot project: first, a lack of financing; and secondly, a lack of political support. Here, citizens' financial participation can lower public costs while providing a grassroots democratic backbone. A Consumer Stock Ownership Plan (CSOP) offers low-risk loan financing of a significant share of the project while requiring only a small financial contribution from the CSOP participants. Combining different revenue sources, the redemption period for repaying the €12.4m debt is 8.5 years. Community participation, in particular citizen capital participation as proposed in this article, anchors the citywide project in the citizenry, thus strengthening its democratic legitimacy and facilitating sustainable urban development.

Keywords: *sustainable investments, citizen/consumer participation, water purification, sustainable urban development*

INTRODUCTION: PROBLEM DESCRIPTION

Water supply issues and sustainable urban

development are becoming even more urgent given the ever-increasing scale and nature of demand in cities of all sizes

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around the world. Many large cities in Europe and elsewhere are situated on rivers or other sizeable bodies of water — lakes, canals, bays and channels. As a rule, they do not serve urban residents as amenities enhancing the quality of life; they are generally too filthy, too polluted and too ill-smelling to swim in, boat on, picnic near or otherwise enjoy. However, this is not a given, as the example of the city of Munich shows. Utilising far-reaching costly measures, the river Isar was renaturalised; today swimming and aquatic sports are core features of urban life which the city advertises on its website.¹ Berlin's river Spree continues to be a problem. Although Germany has greatly improved surface water quality over the last decades and the Spree is swimmable on the outskirts, the river and its subsidiary streams within the city are periodically contaminated when heavy rainfall overwhelms the municipal sewage system and, in order to protect the streets, the overflow, including raw sewage, is diverted into the Spree.² Given the river's weak current, the effects of these overflows last for weeks. The enriched mix of toxic substances, bacteria and nutrients is a threat to both human and aquatic life.³ Oxygen deprivation results in massive fish deaths,⁴ as for example occurred on 8th June, 2015.⁵ As in many other cities, it is not years of industrial exploitation and neglect or illegal dumping of waste that periodically deteriorates the water quality but the city's own sewage system.

CONVENTIONAL SOLUTIONS

The city of Berlin has long tried to deal with this problem by constructing underground concrete basins as buffers and by introducing an intelligent canal control system. In 1998 an action plan was put together to invest €157m — split 60/40 between the state of Berlin and

the Berlin Water Works — to reduce by half the 'mixed sewerage overflow' by 2020; the strategic target set by the Berlin Senate was 'to achieve a mid- to long-term reduction of emissions (AFS, heavy metals, PAK, TP) by 50 per cent through a consequent realization of de-central, semi-central as well as central measures for a physical rain water treatment'.⁶ In early 2015, the Berlin Senate announced a long-term goal of making all surface waters connected to the city centre's combined sewerage system swimmable.⁷ An eventual 310,000m³ of buffering space is to be built, of which 230,000m³ has been completed so far, according to the Senate administration for city development and environment.

The techniques applied — all underground — are based first on concrete buffering tanks and secondly on intelligent canal management which re-channels sewerage through weirs and throttles (intentionally designed bottlenecks) within the approximately 2,000km of the canal network (an overview of current projects is included in the notes⁸). Since 2012 the water management system has been partially automated by a so-called 'Guide and Information System' ('Leit- und Informationssystem' LISA), which utilises the coping potential of the city's vast canal system. Since no given rain event affects the entire city equally, the lighter or unburdened areas can function as an inexpensive buffer, adding up to 220,000m³ at the relatively modest average cost of €500 per m³. The much more expensive underground concrete tanks cover only a fraction of this,⁹ so buffering an additional 35,900m³ at an average cost of €4,100 per m³ (for details see '**Comparison of conventional measures with the LURITEC system**' below) is very cost-ineffective, yet when added up falls far short of that required to neutralise the roughly

3–4 million cubic metres of untreated wastewaters discharged into the river each year.¹⁰

SUMMARY OF THE COMPLEMENTARY LURITEC SYSTEM

The 'LURITEC' system designed by the Berlin based LURI.watersystems.GmbH engineering firm could make a significant but cost-efficient contribution towards closing this gap in buffering space. Pre-manufactured, modular synthetic glass fibre tubes replace traditional concrete tanks and these are positioned in the river itself rather than underground (Figure 1). The high-strength composite material consists of reactive resin, non-swellable quartz sand and integrated glass fibres. A horizontal DN 3000 pipe onto which DN 3000 T-pieces are laminated serves as the base component. In cities like Berlin where wastewater treatment as such is not a problem, the LURITEC system provides an additional buffering cushion for sewage overflow during heavy rainfall. Once water levels recede, the tank contents are

re-channelled into the sewage system to be treated normally.

However, if and when needed, the system could be equipped with modules for on-site wastewater treatment. In the initial treatment stage, mechanical sedimentation and deposition techniques are utilised, eg settling tanks, oil and grease skimming tanks, grills and fine sieves. In the second stage, wastewater is biologically processed, with organic substances broken down by bacteria. Appropriate techniques are also used to remove nitrogen and phosphorus. In the biological treatment stage, a number of proven technologies can be utilised, eg aerobic and anaerobic packed bed procedures, anaerobic baffled reactor (ABR) and sequencing batch reactor (SBR) technologies, planted soil filters ('wetlands for wastewater treatment'), and activated sludge processes.

In Berlin, preventing pollution during recurring periods of heavy rain would not just significantly improve the quality of urban life, it would also be a huge step toward meeting the European

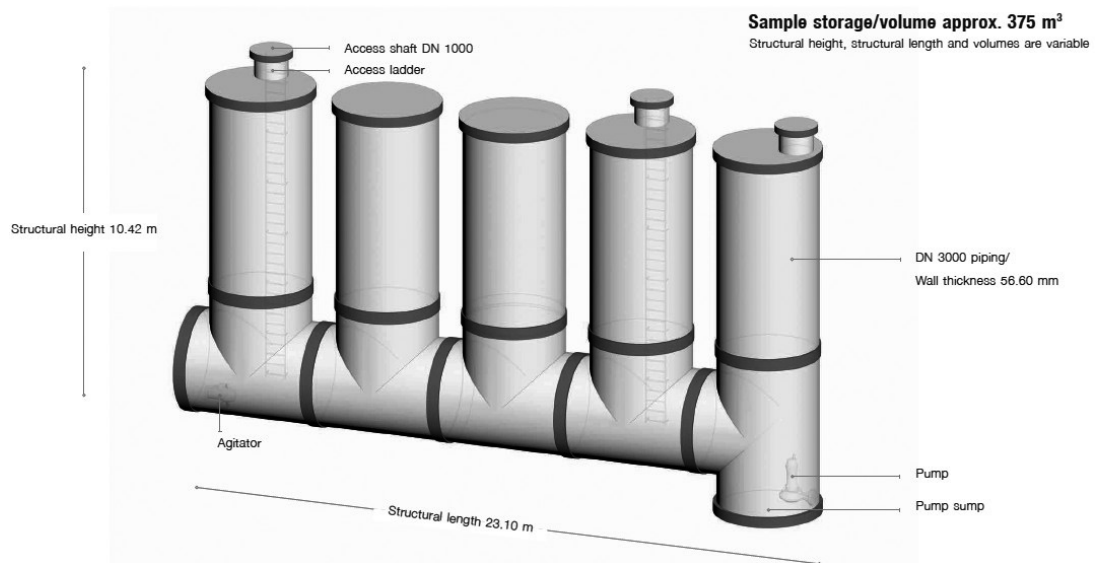


Figure 1: A LURITEC plant as a combination of vertical and horizontal tubes

Source: LURI.watersystems.GmbH

Union's recommended standards for water quality which will soon become mandatory. Directive 2000/60/EC — transposed into German federal law by the 'Wasserhaushaltsgesetz' — requires achieving 'good water quality' of surface water and groundwater from 2001 until 2015.¹¹ The planning of measures may, however, be prolonged until 2027 under certain circumstances. Consequently, during a presentation before the Senate's committee on health, environment and consumer protection in 2008,¹² Water Works chairman Jörg Simon already indicated that he considered the LURITEC system to be a viable addition to the repertory of possible measures.

The surface of the tanks creates an artificial island which, due to the system's modular construction, can be adapted to a variety of uses, eg restaurant sites, recreational areas or landscaped gardens, as illustrated by Figure 2.

IMPLEMENTING LURITEC BY MEANS OF A CONSUMER STOCK OWNERSHIP PLAN (CSOP)

Two major obstacles impact full-scale implementation of the LURITEC system. The first is financing and the second is the lack of political support. These problems are reciprocal. The city of Berlin is unlikely to make such a financial commitment without political advocates, who in turn will be harder to convince the more costly a novel infrastructure project is. This conjunction is where citizen financial participation can be the key to lowering the public cost, while at the same time providing grassroots support. A CSOP meets both of these requirements. It facilitates a low-risk loan large enough to finance a significant share of the project costs while requiring only a small financial contribution from the CSOP participants. A large-scale project like a Berlin-Water-CSOP with from ten to hundreds of thousands of participants



Figure 2: LURITEC installation in a river or lake as an element of integrated town planning

Source: LURI.watersystems.GmbH.

would constitute a powerful interest group well able to argue their case in the political arena.

The classical CSOP model enables long-term consumers of utilities such as electricity and water to become co-owners of their local suppliers.¹³ Potential CSOP participants are low-income households with few or no financial assets — households which own no productive capital and lack the savings or credit which are a prerequisite to acquiring it. The CSOP as a low-threshold financing concept opens the opportunity for credit-financed investment — common in the business world — to the broad group of consumers who are typically denied access to capital credit. Corresponding liabilities are secured by the investment and subsequently paid back from its future proceeds. After the loan is fully amortised the CSOP passes income on to participants in the form of dividends.

The LURITEC system — in contrast to conventional underground systems — is particularly suitable for the CSOP's broad constituency. Its artificial islands are a visible reminder of the public effort to keep the Spree clean. In place of technical installations looming out of the water, citizens are provided with new spaces for recreational use, for gastronomy, or for just enjoying the scene as part of a new urban living quality. CSOP participants will — through their equity investment represented by a trustee — also have a say in decisions concerning potential use of the island's surface. This anchors the citywide project in the citizenry and strengthens its democratic legitimacy, while at the same time limiting the risk of the islands being dominated by privilege in the course of on-going gentrification. Citizen capital participation thus surpasses mere co-financing, laying the groundwork for the project's acceptance and political support. Using the Berlin-Water-CSOP to finance the LURITEC system will

unite all citizens of Berlin in the common interest of maintaining a clean river.

SPECIFIC CHALLENGES FOR THE BERLIN-WATER-CSOP

The Berlin-Water-CSOP would to some extent differ from the classic CSOP inasmuch as creating a source of income for its participants would not be its primary purpose. This CSOP is envisioned as an instrument of communal and economic policy as well as environmental protection. It enables members not only to participate in the decision-making process but grants an ownership stake in the infrastructure of their city. On the other hand, it offers only modest monetary returns (for possible long-term rewards, see Conclusion below). While the Water-CSOP will certainly generate revenues to meet its credit obligations and — following full amortisation — will distribute those revenues among its participants, the large number of participants, combined with a relatively low-income profile, will allow for annual payments of symbolic size only, eg given 200,000 participants, after a redemption period of nine years, the annual payout would amount to €8 per participant (see sample calculations below). But on the positive side, the project could spectacularly improve the urban environment while actively involving citizens in the civic planning process.

The modest revenues, however, pose a challenge. Unlike the utility services of a classic CSOP, it is not possible to market an unpolluted river. The Spree belongs to all. A clean, publicly accessible Spree is an amenity which benefits all citizens regardless of whether they participate or not; this is a classical free rider problem where a party receives the benefits of a public good without contributing to its cost.¹⁴ Thus, while the services of other CSOPs, eg energy, can be sold

to individual consumers at a profit, the ‘product’ of the Water-CSOP — a cleaner river and more healthy and beautiful environment — cannot be promoted directly in monetary terms. Herein lies the central challenge for the Water-CSOP: generating sufficient revenues from voluntary citizen subscribers. The Water-CSOP will need to explore alternative sources of revenue in order to re-finance its initial investment (see below).

EXTENDING THE PILOT PLANT TO THE AREA ‘EISENBRIDGE — MÜHLENDAMM SLUICE’

One LURITEC pilot plant has already been installed in the Berlin East Harbour to demonstrate the system’s effectiveness. It has been monitored and evaluated by the Technical University Berlin for the past two years and was finally taken over by the Berlin Water Works in late 2016.¹⁵

In the project’s subsequent phase an additional 13 discharge points of

the combined sewage system between Eisenbridge and Mühlendamm sluice are to be equipped with LURITEC installations (see maps in Figures 3 and 4). The necessary buffering volume for each discharge point varies between 200m³ and 11,500m³.

With construction costs between €1,200 and €3,000 per m³, the project will require a total investment of €60m for installation of a total volume of 42,000m³. Construction, including planning and authorisation, will take an estimated three years, with annual upkeep and maintenance costs of about €75,000.

FINANCING OF THE EXTENSION OF THE PILOT PLANT THROUGH A CSOP

The CSOP is a financing method that unites the cooperative’s close relationship to citizens as small-scale investors with the flexibility of the limited corporation within the existing legal framework (see Figure 5). As a low threshold concept

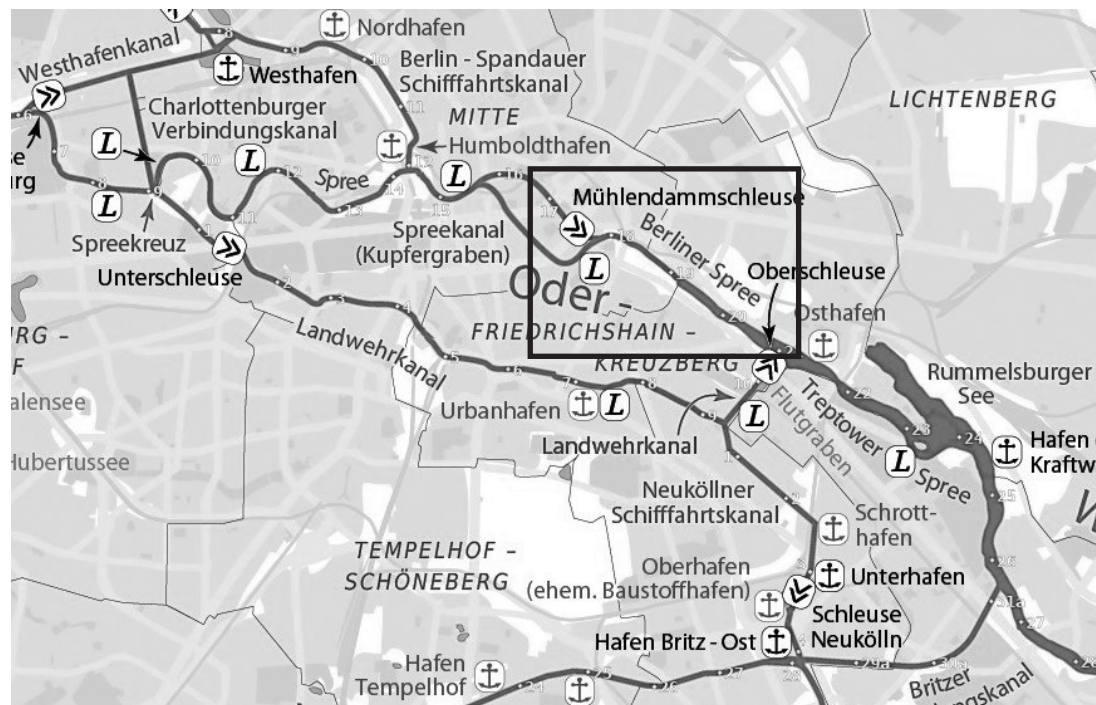


Figure 3: Waterways in central Berlin¹⁶

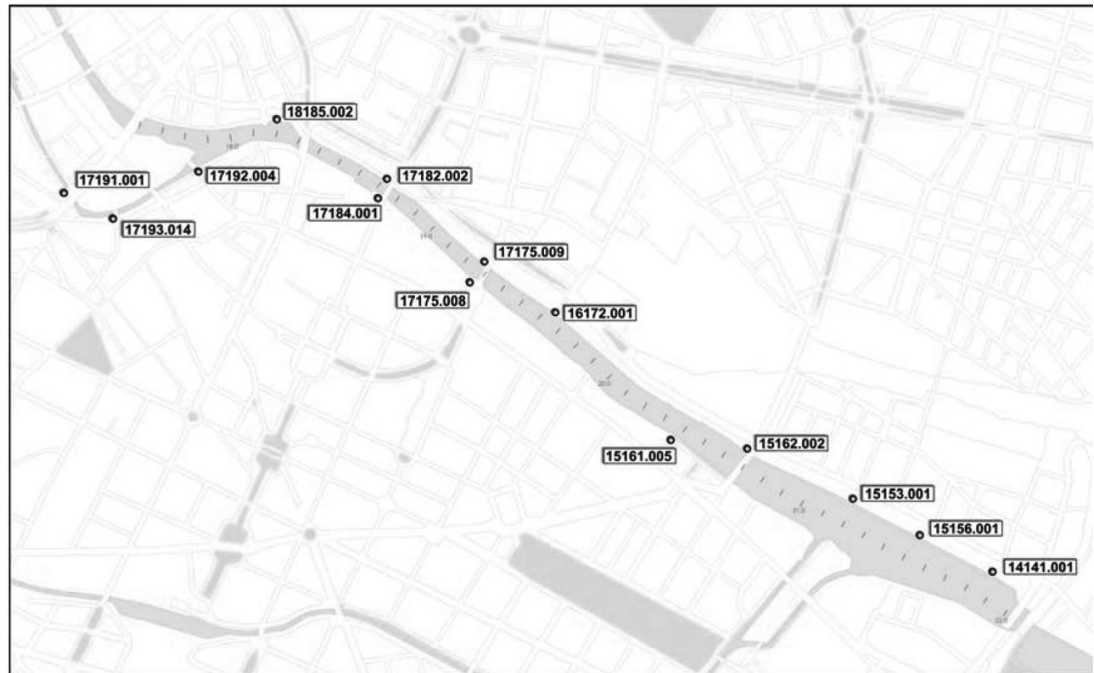


Figure 4: Discharge points of the combined sewage system between Mühlendamm sluice and Elsenbridge

Source: LURI.watersystems.GmbH

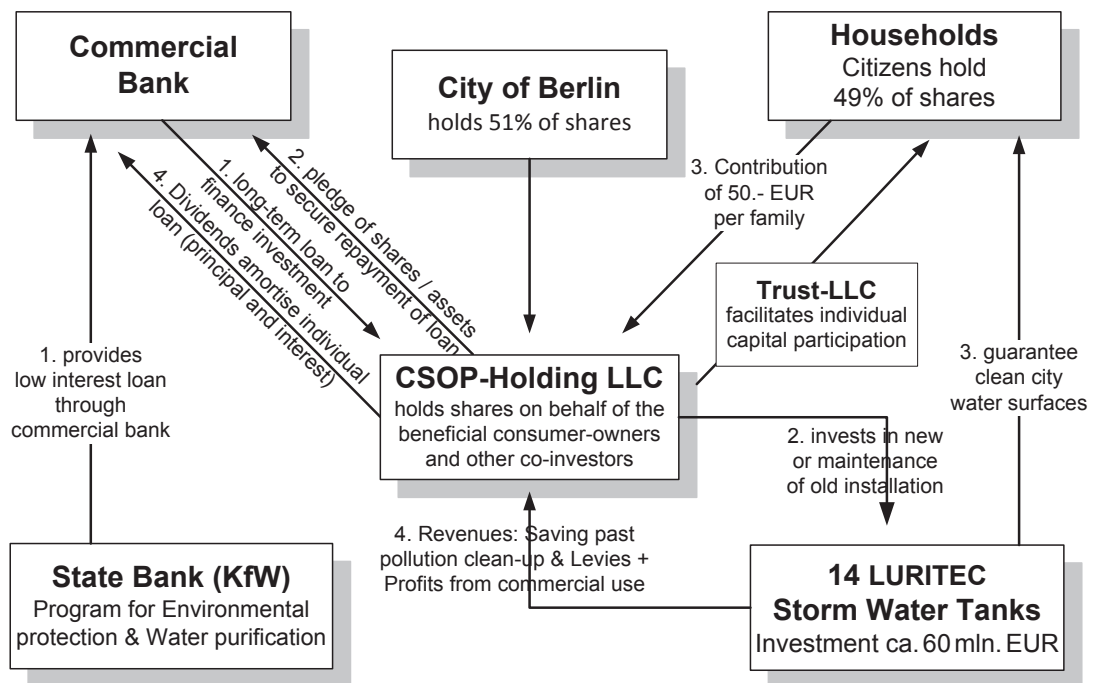


Figure 5: Financing a LURITEC system to maintain a clean Spree using the CSOP concept

Source: own illustration.

it provides credit financing while at the same time limiting individual liability of citizens to the sum of their contribution. Employing trust agreements between the citizens and a trust limited liability company (Trust LLC) is sufficient to make shares easily transferable. In the event of a change of citizen-shareholder the buyer or heir simply replaces the former trustor in the trust agreement. Unlike direct participation of consumers as shareholders of the CSOP-holding limited liability company (CSOP-holding LLC), changes of the citizen-shareholders need not be filed with the commercial registry. Furthermore, the amount of the individual participation held and administered by the trustee can vary over time without necessitating any alterations of the share capital of the CSOP-holding LLC.

The indirect shared ownership using a separate intermediary entity, ie the Trust LLC, which manages the shares held in trust for the citizen-beneficiaries and pools the voting rights executed by the trustee, implies a due ‘professionalisation’ of management. Participation in decision making is channelled through the trustee while individual consumer-shareholders may execute control rights on a supervisory board or an advisory council. The CSOP’s permanent administration and representation will ensue costs of €120,000 annually. Strategic investors such as a municipality or an external investor can easily buy into the project acquiring shares in the CSOP-holding LLC while being guaranteed corresponding voting rights (for details see note 13). This legal construction — also implemented as a

standard model in real estate funds — renders the capital participation attractive not only for citizens but also for the city of Berlin and the Berlin Water Works.

In the Water-CSOP model proposed herewith (see Table 1) the city as majority shareholder contributes 51 per cent of the investment sum (€30.6m); the remaining 49 per cent is raised by the CSOP through an initial one-time contribution of the participating households (200,000 households each paying €50 equals €10m), equally nonrecurring environmental compensation fees (€7m, see section c) below) and a bank loan (€12.4m). Taking into consideration the majority shareholding of the city of Berlin as well as the CSOP’s large equity share, the project can assume a low risk evaluation. For innovative investments with only limited risk the state-owned German Bank for Reconstruction (Kreditbank für Wiederaufbau — KfW) offers interest rates of 1.41 per cent over a period of up to ten years.¹⁷

THE CSOP’S SOURCES OF REVENUE AND THE AMORTISATION OF THE INVESTMENT

As pointed out above, making the Water-CSOP profitable is challenging because of the nature of its service. In order to meet its liabilities the CSOP will combine a varied income mixture: a) a service fee equal to the amount of savings on post-pollution costs (including discharge penalties for polluting the river with untreated wastewater as well as costs for measures to counteract the adverse effects

Table 1: Basic data for the LURITEC Water-CSOP. Source: own calculations

Total investment	60,000,000 €	Financing conditions	
Share of the city of Berlin	51% (30,600,000 €)	Bank loan	12,400,000 €
Share of the CSOP	49% (29,400,000 €)	Interest rate	1.41%
Total citizen’s contribution	10,000,000 €	Annual Overheads	
Number of participants	200,000 households	LURITEC maintenance	200,000 €
Contribution per household	50 €	CSOP overhead	120,000 €

on the aquatic ecosystem); b) rental income from letting the newly created island properties; and c) nonrecurring environmental compensation measures legally imposed on other construction projects in the city. With a combination of these revenue sources (see Table 2), the redemption period for repaying the €12.4m debt is eight-and-a-half years (see Table 3). For an overview of income and expenses see Table 4.

a) Saved post-pollution costs: LURITEC as a service provider to the City of Berlin/Berlin Water Works

To determine an alternative revenue structure a change in perspective is

necessary. Instead of charging the ‘users’ of a cleansed river, ie all citizens of Berlin, the Water-CSOP presents itself as a service provider to the City of Berlin or, respectively, the Berlin Water Works. Thus, it would bill those primarily responsible for preventing the adverse effects of sewage overflow on the river. Key to this approach is the fact that high costs for post-pollution clean-up already incur to the city and water works. The Berlin Water Works pays an annual €1.5m to compensate for the untreated discharge of sewerage water into the river.¹⁹ These penalties are already a hidden part of the citizens’ water bill. Additionally, an ‘oxygen boat’ operating on weekdays from May to September along the Spree and neighbouring bodies of

Table 2: Potential revenues of the LURITEC Water-CSOP. Source: own calculations

Basic data (annual revenues)		Assumptions rental income	
Communal savings discharge fees	501,505 €	River surface project area	540,000 m ²
Communal savings “oxygen boat”	225,000 €	<i>Thereof:</i> New real estate	3%
Environmental compensation measures*	7,000,000 €	<i>Thereof:</i> commercial use	30%
Rental income	1,166,400 €	New area for rent	8,100 m ²
		Min. rent per month ¹⁸	12 €/m ²

* Total nonrecurring amount for implementing all installations

Table 3: Redemption period for the CSOP loan

Loan: 12.4 Mill. € / Interest: 1.41%			
Year	Remaining Loan	Principal payments	Interest payments
1	11,000,695.01	1,399,304.99	173,600.00
2	9,581,799.74	1,418,895.26	154,009.73
3	8,143,039.95	1,438,759.80	134,145.20
4	6,684,137.51	1,458,902.43	114,002.56
5	5,204,810.45	1,479,327.07	93,577.93
6	3,704,772.80	1,500,037.65	72,867.35
7	2,183,734.63	1,521,038.17	51,866.82
8	641,401.92	1,542,332.71	30,572.28
9	0.00	641,401.92	8,979.63
Total		12,400,000.00	833,621.49

Table 4: Total earnings and expenses over a ten-year period

Expenses		Earnings	
Principal payments:	12,400,000.00 €	Rental income:	9,929,144.98 €
Interest payments:	833,621.49 €	Saved post-pollution costs	
Maintenance costs:	1,800,000.00 €	/ oxygen boat:	1,915,344.32 €
CSOP overheads:	1,090,000.00 €	/ discharge fees:	4,269,132.19 €
Total:	16,113,621.49 €	Total:	16,113,621.49 €

water, enriching them with oxygen, costs roughly an additional €450,000 per year merely to prevent or at least reduce the periodically occurring pollution-caused mass death of fish.²⁰

These costs can partly be avoided by implementing the next LURITEC project phase as described above (covering the river from Elsenbridge to Mühlendamm sluice). The savings can be channelled to the Water-CSOP during its amortisation period (or permanently) as a service fee for its contribution towards maintaining a clean river and thus past pollution cost reduction. This would lay the foundation for refinancing the CSOP's credit liabilities.

b) Commercial use of the artificial Spree islands

Implementing the extension of the LURITEC project creates artificial islands on the river with a combined surface of 22,000m². This new real estate can at least partially be rented out for commercial purposes; we estimate 30 per cent of the surface would be suitable. Rent payments make up the second chief resource for refinancing the Water-CSOP. Along its course between East Harbour and Mühlendamm sluice the river passes some of the city's most prestigious locations, while the waterfront offers lucrative potential for gastronomy, art and culture as well as for high-class offices. The flexible, modular structure of the LURITEC system allows the islands to be placed as needed, largely independent of the actual discharge points. Connected underwater, the islands can be combined to form larger surfaces in the most convenient and/or lucrative locations.

Of course, utilising the island surfaces poses challenges. The pilot plant in the East Harbour confronted a bureaucratic quagmire on the use of its surface, which eventually ended in a ban of any

not technically necessary objects on the platform, including plants or construction of any kind. Eventually, objections by the owners of a neighbouring riverside property turned out to be sidelining legal issues. The 'Berliner Hafen- und Lagerhausgesellschaft mbh' (BEHALA) feared for the value of properties for whose sale they were charged. However, the upcoming project would face fewer problems since the BEHALA has by now sold most of their riverside properties and will thus play only a minor role in upcoming negotiations. Furthermore, private owners and businesses should have little reason for similar opposition since in the long run a successful project will most certainly lead to rising property values. Lastly, the Technical University's evaluation of the pilot phase will serve as a sound basis to argue the innocuousness of the LURITEC system.

Nevertheless, construction on river sites will be subject to local government authorisation and regulation. It is unlikely that permits will be *carte blanche*. Therefore the CSOP should include a comprehensive plan for zoning the islands for both recreational and commercial use. This means striking the right balance between the two. Public spaces will not produce income but broad civic participation is the justification for the project. On the other hand, the income produced by commercial sites is necessary to make the project financially feasible.

c) The Spree islands as an environmental compensation measure for other construction projects

Compensation or replacement measures are an environmental policy tool to counteract environmental damages caused by progressing urbanisation; they have priority over monetary compensations which are subsidiary if compensation or replacement is not possible or is unfeasible.

For the sealing of surfaces during construction, owners have to contribute to the re-naturalisation of other properties. Park and forest spaces are primarily meant to be created or expanded, but more broadly defined environmental projects can also be financed this way.

The cost-by-cause principle remains applicable, meaning that a building's owner is obliged to implement the necessary compensation or replacement measures. Therefore, it is also up to him to locate and choose applicable spaces (possibly his own) for compensation. According to the Federal Nature Preservation Act, water ministration as such is not considered an environmental protection or landscape preservation measure. However, environmental protection measures falling under the act, eg renaturalisation including the greening of embankments and the growing of reed beds, can serve as river purification.²¹ Against this background the aim is to place the LURITEC installations of the Berlin-Water-CSOP as a possible target for compensation or replacement measures in order to generate an additional source of revenue.

d) Citizen donations

As mentioned above, citizens already share the cost of pollution clean-up through charges to their water bill, although to date these costs have not been separately itemised; consequently, consumers remain unaware of them. This poses the question of how much of this cost the citizens of Berlin would be willing to voluntarily contribute to underwrite a pollution-free environment. If they were willing, the Water-CSOP's financing costs would be reduced and it would be easier for low-income households to participate.

This last point is important, because the lack of income becomes an issue when broad citizen participation is desired. While the initial equity contribution

remains in the low range of €50–100, given the high percentage of poor inhabitants in Berlin, compared to other German cities, a significant number of households may consider this contribution too costly. A donation fund should be considered to facilitate the participation of low-income households. Studies on citizen appreciation of environmental amenities (eg a clean river) suggest that there is general willingness to pay for restoring or maintaining natural surroundings.^{22,23} This willingness, however, varies greatly from region to region. Donations should be considered only as a complementary measure to fill potential financing gaps.

COMPARISON OF CONVENTIONAL MEASURES WITH THE LURITEC SYSTEM

Construction costs of concrete underground rainwater tanks sink as volume rises. The literature assumes costs from up to €2,500 to slightly under €1,000 per m³.^{24–26} A tank of 250m³, for example, would cost twice as much per m³ as a tank of 2,000m³; the greater cost savings occur in this range and apply to both the concrete tanks contemplated by the Berlin Water Works and the glass fibre tubes of the LURITEC system, although the cost level is generally higher (see Figure 6).

In general construction costs in Berlin are high because of urban density; utility lines may have to be rerouted. LURITEC plants, being built underwater, do not affect the existing infrastructure. This feature alone makes the LURITEC system a cost-efficient alternative which is particularly obvious for basins of up to 3,000m³, as shown in Figure 6.

POTENTIAL PARTNERS AND STAKEHOLDERS

Successful implementation of the Water-CSOP will require close cooperation with

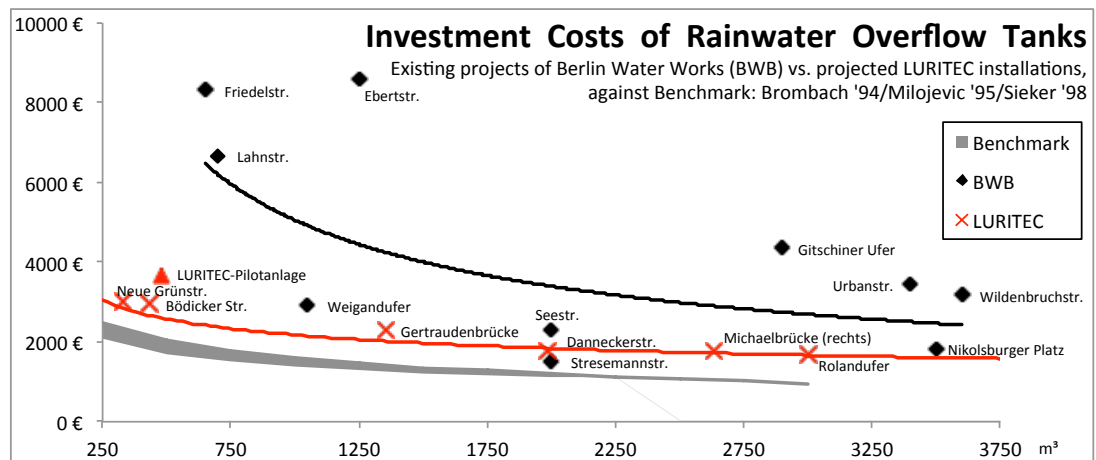


Figure 6: Comparison of costs for rainwater overflow tanks in Berlin

Source: Calculations against benchmark by P. Slevac using data from Berlin Water Works and LURI. watersystems.GmbH.

the City of Berlin, the districts bordering on the river, the water and shipping office and, most importantly, the Berlin Water Works itself. Even with the city’s major financial contribution, districts have a right to veto objectionable changes to their neighbourhoods. The Berlin-Water-CSOP must also involve its citizen participants in ways beyond financial incentives. Because the Water-CSOP is more of a civic than economic project, it is important to involve civic organisations, especially those active in water uses and public participation. Dialogue with the community will allow potential objections and problems to be detected and addressed at an early stage.

CONCLUSION: OPTIONAL EXPANSION OF THE CONCEPT INCORPORATING A COMMUNAL POLICY TO BALANCE GENTRIFICATION

The Berlin-Water-CSOP can also ease the gentrification that improved water quality will most likely bring about. As soon as polluted urban rivers, ponds or lakes are cleaned up and made attractive for a wide range of recreational activities,

properties on or near waterways will become popular. However the Senate administration decides to improve water quality — implementing the obligatory EU standards and facilitating bathing in the inner city area — the value of waterside properties will undergo a significant rise. Higher rents may lead to social friction and conflict with established tenants — a consequence that the Senate probably neither intends nor wishes.

The ongoing debate in Berlin on freezing rents shows that communal policy intervention is far easier to demand than to implement. Conflict over maintaining a clean Spree may arise between the Berlin citizenry — the ones who eventually pay for the project, not only directly through their investments but indirectly through taxes and water bill charges — and the small minority of property owners who would benefit economically from higher rents resulting from the project’s success. This is a classic example of the free-rider effect which compromises the primary objective of providing public access to all citizens, especially those who are unable to afford

recreational facilities outside of Berlin. Under present circumstances, efforts to improve the quality of urban living for the public in general could end up benefiting a small and already well-capitalised segment of the population while inadvertently shutting out a much larger population of less well-off citizens.

The CSOP concept, based on broad public and financial participation, may help to prevent this development. To compensate for an accidental free-rider effect, property owners might pay to the CSOP a small percentage of the appreciation value triggered by the environmental improvement — perhaps 3–5 per cent — as a levy. Once the bank loan is repaid, the CSOP would distribute payments from this levy as dividends to participants who made financial commitments to the project. To defuse accusations of introducing a special tax, the levy would be made conditional on actual appreciation of the real estate in the area. Such a levy may be voluntary or compulsory. CSOP participants would thus gain financial compensation for their commitment that could equally help to balance the expected rises in rents. At the same time, the citizens who directly profit from the measures would bear their fair share of the expense. This would avoid the free-riding of non-participating citizens as well as of the property owners who directly benefit.

Such community participation — particularly citizen capital participation as proposed in this paper — can anchor a citywide project in the local citizenry, bolstering its democratic legitimacy while at the same time facilitating necessary sustainable investments in the urban infrastructure.

Acknowledgement

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Notes

1. See <http://www.muenchen.de/freizeit/sport/surfen.html> (accessed 25th July, 2016).
2. Berlin, as most large cities, features two types of sewage systems: in the city centre rain and wastewater are jointly collected and lead on to the nearest treatment facility in a combined system; in the outskirts rain and wastewater disposal are separated.
3. Federal Ministry for the Environment (2013), 'Nature Conservation B and NS. Water Management in Germany. Part 2: Water Quality [Internet], Bonn', available at https://www.umweltbundesamt.de/sites/default/files/medien/378/publikationen/wawi_teil_02_2014.pdf (accessed 29th September, 2015).
4. Berlin House of Representatives (2013), Brief Parliamentary Enquiry by the Representative Danny Freymark (CDU) from 4th July, 2013, 'Quality of Berlin's Surface Waters', Parliamentary Paper No. 17/12 398.
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