

Is rural sanitation an Insurmountable problem or an opportunity for introducing a new approach to service provision?

# Rural Sanitation in Egypt

Egypt Network for Integrated Development

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**Policy Brief 010**

## **Sanitary Services in Egypt: A Historical Perspective**

Private European investors established the first modern water companies for Cairo and Alexandria in the second half of the nineteenth Century. Simultaneously, the Suez Canal Company supplied drinking water to the cities of Port Said, Ismailia and Suez. In 1956, the government nationalized the three companies and established the General Organization for Potable Water (GOPW) which built and operated seven regional water systems in the Delta. Municipalities operated water systems in some towns and while housing directorates operated smaller water systems in some rural areas. But until as late as the end of the 1970s, the main players in water and sanitation were the three nationalized companies and GOPW.<sup>1</sup>

In 1981 the government merged the Cairo and Alexandria companies into one organization, the Cairo and Alexandria Potable Water Organization, CAPWO, to be responsible for water and sanitation in the two cities. Another entity, the National Organization for Potable Water and Sanitary Drainage (NOPWASD) was established to consolidate all other investments into a single entity and to establish a water and wastewater company in each governorate. However, progress was slow with only three companies created in the two decades.

The next wave of institutional reform was implemented in 2004 to address continued sector fragmentation, lack of comprehensive national vision and continued poor service quality. The structure introduced the Holding Company for Water and Waste Water (HCWW), under which there is a local company responsible for water and wastewater management in each governorate.<sup>2</sup> The government also established the Egyptian Water Regulatory Agency as an independent body to regulate the overall performance of the sector.

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<sup>1</sup>Moawad (2011).

<sup>2</sup>Investment in the sector is still conducted by CAPWO for Cairo and Alexandria and NOPWASD for other regions in the country. The Suez Canal Company remains responsible for investment and operation of water and wastewater services in the Port Said, Ismailia, and Suez Governorates.

## **Current Status of Sanitation Service Coverage in Egypt**

The government of Egypt continued to give higher priority to water service coverage. As a result, water service coverage in 2004 was 96% (21 million m<sup>3</sup>/day produced). Subsequent large investments were made in water production plants that did not just take national water coverage to 100%, but added a total of 11.4 m<sup>3</sup>/day to the amount produced in 2005, a 59% increase. As a result, significant improvements occurred in water quality and service consistency especially in rural areas and in informal areas around major cities.

The provision of sanitary services, especially in rural areas did not receive the same level of government attention. As a result, coverage of urban sanitation was only 56% and rural coverage of villages 4% of village until as late as 2004. The government pledged to raise the ratio of villages connected to sanitation networks to 11% and managed to reach 13% coverage by 2010 (603 villages from a total of 4670). In 2010, significant coverage of urban sanitation was reached with government pledging to reach 100% coverage of sanitary services by 6/2012. However, until now, according to the Minister of Utilities, still 27 cities do not have any sanitation and another 37 cities have uncompleted projects.<sup>3</sup>

Projects that were projected to be completed by 6/2012 would have brought that percentage of coverage to around 20% of the total number of villages (903 villages) and to reach 100% in urban coverage. It is doubtful that these percentages have been reached given the reduced government resources allocated to the sector in 2011/12 and 2021/13 public investment outlays.

## ***Mismatch between Water Supply and Sanitary Services Capacity***

Notwithstanding the emphasis on mismatch between water service and sanitary service connection coverage that various human development reports emphasize, a more serious mismatch exists between water production and the capacity to collect and treat wastewater. Currently, water distribution networks stretch over 146,000 km vs. only 39,000 km for sanitation networks and only two-thirds of water

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<sup>3</sup>Masry Al Youm interview with Minister of Utilities, October 9th, 2012

produced is collected (16 million m<sup>3</sup>/day of 24 million m<sup>3</sup>/day) and only (10 million m<sup>3</sup>/day) is treated.<sup>4</sup>

This means that the most important challenge is to collect all wastewater produced through networks or other mechanisms and to be able to build necessary wastewater treatment plants. Ideally secondary treatment is required, but the objective must be at least to secure primary treatment for all wastewater currently produced.<sup>5</sup> Otherwise, pressure will continue to build up on existing collection and treatment facilities and households' resort to informal methods of discharging of wastewater will continue to pollute water resources and the environment.

### ***Investment: Past, Current, and Future Investment Needs***

The government allocated over LE 60 billion of investment to water and wastewater sector in the period 2005-2010, an annual average of LE 12 billion and using close to 30% of total public investment in 2009/10. Roughly 60% of this amount was still allocated to water services.

After the Jan 25<sup>th</sup> Revolution, investment directed to water and sanitation projects (combined) was LE 4 bn in 2011/12 and LE 3 bn in 2012/13.<sup>6</sup> Public Investment figures quoted for 2013/2014 for the sector indicate that the NOPWASD will complete investments leading to serving 178 villages, which will cost LE 2.4 billion, in addition to channeling investment in 18 large WWTP. Figures do not include CAPWO for Cairo and Alexandria, which indicates a possibility that total investment in the sector may have increased over the previous two years.<sup>7</sup> Still nothing comparable (even in nominal terms) to investment allocated to the sector before

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<sup>4</sup>Other relevant estimates to this mismatch in water production vs. collection and treatment of wastewater are: wastewater collected per year: 6.5 billion m<sup>3</sup> of which 3.5 billion m<sup>3</sup> is treated (80% secondary treatment and 20% primary treatment), resulting in only 54% of collected water receives any degree of treatment.

<sup>5</sup>According to Egyptian Code of Practice 501-2005, primary treatment of effluent allows irrigation of forest trees and industrial oils, while secondary treatment allows for irrigation of fodder (sorghum), crops for human consumption, the peel of which is not eaten and fruits for canning (such as lemons, mangoes, olives and dates), greenbelts and nurseries of fruit trees, cut flowers and fiber crops such as flax and sisal. Source: Qena Utilization of Effluent GTZ.

<sup>6</sup>Global Water Intelligence, (Nov 2012).

<sup>7</sup>Singapore International Water Week, website accessed Oct 15<sup>th</sup>, 2013.

2011. On the other hand, the National Master Plan for Water Supply and Sanitation conservatively estimates investment needs of LE 170 billion, over the period 2007-2037, out of which two thirds are required for sanitation nationwide.<sup>8</sup>

As for reaching 99-100% coverage in rural areas, the government rural sanitation strategy utilizes the cluster approach which envisions the need for 600 sanitation service clusters (SSCs); each designed to accommodate 100,000 inhabitants by 2040 to accommodate projected population growth. The total investment cost needed for 100% rural coverage was estimated at around LE 80 billion (in 2008 prices). The government's current strategy to overcome unavailability of funds is to connect unserved villages to nearby plants where excess capacity exists and postpone the establishment of new treatment capacity to a second phase when resources become available. Officials state, however, that even if resources are available, it will take at least 10 or 15 years to reach comprehensive coverage of sanitary services in the countryside.<sup>9</sup>

### ***Informal Household/Community Solutions***

In the meantime, still around 85% of rural areas do not have public sanitation networks. Households devise informal solutions to dispose of wastewater that vary according to each household's financial means. They typically rely on septic tanks which, if they continue to serve a single house, they function properly without the need to resort to collection (natural evaporation of liquids and utilization of solid remnants, etc).

The problem, however, arises when households resort to septic tanks and vaults to service multi-family houses. In this case, it becomes necessary to find means of disposing of collected wastewater by trucks in the absence of pipe networks.

Households resort to private operators for conveyance of wastewater to nearby collection or treatment plants, if they exist. Parties to these arrangements negotiate fees, time, and frequency of collection. It is common, however, that in the majority of villages at least some families cannot afford or are unwilling to pay the required

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<sup>8</sup>HCWW, National Strategy for Water Supply and Sanitation, Compilation of Water and Sanitation Master Plans, May 2009

<sup>9</sup>Sanitation needs of communities of less than 3000 inhabitants and/or those that are remotely-located from clusters are expected to be addressed through other small, decentralized models. These, typically represent 1%-2% of rural population.

fees. These will simply dispose of wastewater outside their houses. In other cases service providers, who do not face effective monitoring from their clients or from government will end up disposing of waste water in the nearest waterway or irrigation drainage network. So it is typical that at least part - if not all- of a village's collected untreated wastewater ends up in village streets, waterways, or irrigation drainage networks.

Another source of groundwater pollution- even if collected water is properly transported to a designated treatment plant- is the construction quality of tanks and vaults. Due to the informal nature of these solutions, the quality of vaults or tanks is not subject to government regulation, and there is no minimum standard that is enforced to reduce potential leakages to surrounding grounds. And because the quality of tanks depends on households' financial means, possible leakages are not uncommon especially in cases of multiple household connections to a single tank or vault.

These factors combine to exhibit a setup where poor service delivery, environmental and irrigation degradation, poor quality of life and health hazards for the majority of rural households characterize the current operation of most rural sanitation solutions.

**Rural Sanitation: Challenges and Difficult Policy Choices**

Conscious of these problems, the government appreciates the importance of addressing rural sanitation by investing in designing a comprehensive sector strategy. Yet, through relying solely on an expensive public investment approach, the government fails to capitalize on what already exists on the ground. A wider perspective is needed in which the government incorporates in the strategy institutionalization and regulation tools to overcome weak operational junctions. This approach can significantly enhance the government's ability to achieve significant results in rural sanitation quality and coverage.

This approach is especially inadequate given the increasing competition from other basic services as well as economic infrastructure required to achieve social and economic objectives of the country. The unlikely availability for large public investment to be allocated towards rural sanitation comprehensive coverage require that the government utilize all tools to implement other require that the sector's strategy, hence the weaknesses of government current sector strategy. The following two sections elaborate on these two issues.

**Competition over Limited Public Investment Expenditures**

About 90% of financing for the sector comes from government budget, with 10% on average from external loans and grants. Furthermore, a separate budget of around LE 1 billion every year has to be provided to the HCWW to cover maintenance and depreciation costs. Over the period 2005-2010 water and wastewater investment managed to receive around 30% of the annual public investment budget.

With the magnitude of investment cost needed in the sector, in 2008-2010, The GoE included water and sanitation projects in its PPP program, as a means of supplementing public investment in the sector. The GoE also prepared a list of rural sanitation projects eligible for PPP in three governorates: Daqahleya, Beheira and Qena. Building on a governorate water and sanitation investment strategy for each of these governorates, the SSC strategic approach for rural sanitation, and taking into account established facilities and projects under construction, PPP project candidates were identified for each of these three governorates.<sup>10</sup> Table 1 summarizes the proposed private investment in rural sanitation in these three governorates.

**Table 1: Proposed list of Rural Sanitation Projects for PPP contracts in Daqahleya, Beheira and Qena**

Governorate	Projects	Villages to be served	Est. Invest LE million
Daqahleya	22	149	1,779
Beheira	15	174	617
Qena	12	92	1,300-1,700

Egypt's uncertain investment climate on one hand, and political environment which is likely to have severe reservations on the current PPP law in particular and concession laws passed in other sectors in general, that it is unlikely that the government will be able to conduct PPP projects in sanitation in the near future. Serious political dialogue and transparency as to the realities of the size of investment resources that can be realistically made

<sup>10</sup> It is not clear the criteria upon which these governorates or whether there are similar PPP project lists for others. Further investigation is needed.

available for water and sanitation in general and rural sanitary services in particular is needed.

While it may be still early to conclude that the share of water and sanitation investment will continue to be limited in the next few years based on one year's share, it is expected that the sector will face legitimate competition for public investment funds from sectors such as education, public transportation, roads, and so forth. Not to mention "mega" projects that the government intends to initiate.<sup>11</sup>

### ***Remaining Weaknesses in the Current Sector Strategy***

Despite important achievements in this sector over the last three decades, and with the ability of the sector to attract significant public resources to upgrading service coverage and quality of water and sanitary services nationwide, the approach to this sector's management remains limited to business-as-usual assessment of investment needs, and waiting for resources to be allocated from the government investment budget. Large foreign donor contributions are typically either allocated to financing projects in high priority areas, or to assistance geared to technical and institutional development of public authorities responsible for the sector or towards design of the strategy for comprehensive coverage and the associated estimated (and many times re-estimated) investment cost needed.

Smaller donor-funded micro projects that rely on some sort of participatory approach were, until very recently implemented with minimal government acceptance and cooperation in most cases, and with resistance and obstacles in others. The most important examples of these projects include models promoted by GTZ and the Egyptian Swiss Development Fund (ESDF) in El Moufty Al Kobra, Om Sen and Koleaah villages in Kafr el Sheikh Governorate, Kom El Daba'a Village in Qena, Atwany Village in Aswan, and Bashandy Village in El-Wadi El Gedeed. Total investment cost for these projects ranged from LE 2- 6 million, with community contributions ranging from land provision (estimated at around 10% of capital investment cost) to as high as 30% in some cases.<sup>12</sup> These projects typically serve smaller village/cluster communities with as few as a 2000 or 3000 inhabitants, but not suitable for communities that exceed 10,000

inhabitants. The chosen technology is typically stabilization ponds. After the establishment of the system, its management is transferred to the village community and user charges are levied to cover the costs of operation and maintenance.

It is difficult to catalogue all the projects implemented or are currently prepared for implementation based on this decentralized participatory model, but anecdotal information suggest that between 10 and 15 projects were completed or are ready for implementation. To our knowledge, there is no comprehensive documentation of the total number of projects that fit under this model, and certainly there is no assessment of the lessons learned, the institutional challenges, or cataloguing of necessary financial, governance, legislative or policy reforms required for model generalization and replication in other communities.

A recent study, however, analyzed the socio-economic and institutional setup of the model (using two Kafr El Sheikh case studies). It concludes that the decentralized sanitation service approach implemented in these projects faces challenges because it requires that clear measures be put in place to redistribute roles and responsibilities between community and government at both construction and operation stages.<sup>13</sup> Recently, sector authorities recognized the decentralized model as a financing source for a segment of rural sanitation needs. As a result, the water and wastewater sector developed a national program that acknowledges the potential for this approach to be generalized.

It is unlikely, however, that the GoE current approach will produce concrete achievements unless serious attention is paid to how to address all aspects of a comprehensive design and implementation framework needed to guarantee successful cooperation among various players and stakeholders of the sector.

Even with adopting a more integrated strategy that addresses these strategic setup, water and sanitation sector leaders, need to simultaneously champion a campaign within and outside government to mobilize and utilize local, national and international communities, private business, NGOs and other civil society agents toward creating a dynamic plan that directs human, institutional and financial resources towards this sector.

### **Qena Governorate: A Typical Story for Sanitary Services in Upper Egypt**

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<sup>11</sup> MoP 2013/2014 Economic and Social Plan, Ministry website

<sup>12</sup> These cost estimates need to be adjusted for current price levels since they are associated with investments implemented in the years 2000-2005.

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<sup>13</sup> Eisele (2011).

The Governorate of Qena represents a typical Upper Egyptian governorate where very few cities have formal sewerage networks and where almost all rural areas rely on informal solutions for sanitary services. In addition, there are projects under construction in many locations that are in dire need of resources. Water and wastewater criteria for giving priority to investment in more densely-populated regions continued to discriminate against Upper Egyptian urban and rural projects.

#### ***Service Coverage and Status of Planned Projects***

Until a few years ago (2005), Qena City was the only place in the Governorate with an integrated wastewater system, with all other cities and villages depending on poorly designed and installed on-site facilities. Approximately 20 % of houses have septic tanks, whilst others either have vault, dry pit latrines or no sanitation facilities at all. Septic tanks and vaults are emptied by vacuum tankers and the resultant waste is supposed to be transported to the nearest sewage treatment works for treatment but often ends up being disposed of in agriculture drains or canals without treatment. Almost all Markaz suffer from a shortage of vacuum emptying. Overflowing of septic tanks is common with resulting localized pollution.

As far back as the 2002-2007 National Five-Year Plan, there were wastewater treatment plants “under construction” in five other cities to be completed by the end of the 5-year plan.

With respect to village sanitation, QWWC records show that only 20 villages/communities are covered by sanitation services, while there are projects underway in 42 additional villages. Table 2 gives the Markaz distribution of these villages.

<b>Markaz</b>	<b>Villages Served</b>	<b>Villages underway</b>
Qena	0	6
Abou Tesht	2	7
Deshna	5	10
Qous	5	4
Nagaa Hamady	3	4
Nagada	1	3
Farshout	3	3
Qeft	1	3
El Waqf	0	2
<b>Total</b>	<b>20</b>	<b>42</b>

**Source:** Compiled from the Ministry of Utilities, Holding Company, El-DAR Consultancy, and CAPMAS

#### ***Government Strategy for Rural Sanitation in Qena***

The Overall Sanitation Plan for Qena envisions the need for 12 SSC. The projected coverage of the Governorate once the plan is implemented is 93.4%.<sup>14</sup>For rural sanitation, some smaller agglomerations with less than 3000 inhabitants or that are remotely located are excluded from the general plan. Possibly, the authorities envision that decentralized solutions will be utilized there. At the present time there are implemented plants and/or plants under construction in 62 urban and rural locations. According to CAPMAS population estimates in 2011, rural population currently served at 8%. After completion of projects under construction or construction of those that have been designed for 59 additional villages, the rural coverage ratio will increase to 47%, leaving 54 % of rural population not served. Some of the proposed projects for private participation represent expanding capacity of existing treatment plants designated for urban sanitation. While the estimated overall investment cost for all sanitary services for Qena is not available for us, the estimated cost for the PPP component ranges between LE 1.3 billion to LE 1.7 billion depending on the technology utilized.

#### **Policy Recommendations – The Way Forward**

For Egypt to achieve significant results in the area of expanding rural sanitary service coverage a country-wide multi-dimensional strategy needs to be promoted and implementation initiated. Failure to

**Table 2: Coverage of Rural Sanitation in Qena and Projects Underway, 2013**

<sup>14</sup>Another plan originally prepared by the HCWW envisions 17 clusters and includes small conglomerates reaching rural sanitation coverage of 99.4%

approach the problem in a comprehensive way produces repercussions that extend far beyond local communities housing conditions. Thus, sanitation has to be addressed beyond the confines of a single sector or in the confines of a single ministry strategy. Sanitary services in general and rural sanitation in particular, must be an issue that attracts the attention of all government and the population as a whole. Components of the multi-dimensional strategy are the following:

***Treat Rural Sanitation as a key Component in Environmental Sustainability and National Health Strategic Objectives***

- Develop a strategy for environmental protection of waterways, agricultural land and housing environment for rural population where the provision of sanitary services is synchronized with other environmental protection activities.
- Utilize the overall macro-impact cost of failing to solve sanitation provision issues in prioritizing public investment allocation to projects within the sector and between sanitation services in general and other service sectors.
- Prioritize upstream sanitary service solutions as an approach that reduces the burden of treatment on down-stream locations, even if that gives priority to less densely populated regions.
- Raise public awareness of the environmental implications of poor sanitation to improve hygiene and develop programs to educate families of minor behavioral changes that can have significant impacts on community health and the environment.
- Organize funding campaigns targeting international developmental donors especially in the soft areas of the (integrated decentralized projects as well as the institutional setup for wastewater conveyance), with a commitment from the government to focus public resources on investment in the maximum number of treatment plants.

***Develop an Institutional Framework that Extends beyond Sector Authorities***

- Ensure that a number of models for low cost sanitation are cleared by regulatory agencies and assist communities with design and construction expertise.
- Ensure that construction and operations standards are reasonable for different sizes and types of communities and geographic settings.
- Work with Ministry of Finance on designing incentives to encourage communities to participate in financing sanitation solutions. (e.g. matching community resources raised with

resources from government budget or offering a grace period where no fees are charged for services, etc.)

- Address financial sustainability issues of decentralized sanitation financed by communities, and develop insurance plans or create a maintenance fund that supports these projects in such circumstances.
- Explore other local funding solutions, such as municipal infrastructure bonds, to mobilize other sources of finance beyond those coming directly from beneficiary communities.

***Formalize Informal Sanitary Service Practices under the Supervision of Government Regulatory Umbrella***

- Develop a strong and comprehensive regulatory framework for conveyance of household wastewater to treatment plants with the right positive and negative financial and regulatory incentives for households and businesses.
- Use both “ahly” and small donors’ best practice projects to draw lessons to be incorporated in a nationwide plan to move away from government monopolization of what needs to be done.

***Revisit Private Participation in Sanitary Sector Infrastructure***

- Initiate a national dialogue to clarify the potentially beneficial role that well-designed PPP (if well-designed) arrangements can produce for the economy and for speeding up of investment in infrastructure in general.
- Address any shortcomings in PPP Law 67/2010 and enhance its ability to clarify ex-ante contractual obligations of all parties.
- Address any regulatory risk or uncertainty that translates into the need for higher returns on private investment.
- Utilize standardized contracts to reduce unnecessary disputes in construction or management, and devise timely dispute settlement mechanisms.
- Be creative in legislative and contractual tools in PPP that may be needed specifically in such a service that has a high public good component.
- Target the PPP sanitation plan to local contracting companies and enhance transparency and competition.

***Utilize Successful Decentralized Models as a Permanent or Interim Solution for Small Villages***

- Catalogue and assess previous experiences and compile lessons learned to develop successful prototypes.
- Address all financial and governance issues and find simple standardized rules to fit the local nature of such projects.
- Provide all necessary assistance to local communities from legal expertise, to explanations of technical options, to pre-project sensitization of community to the approach.
- Endorse successful models and generate media coverage to enhance communities' willingness to participate.

***Institutionalize Community Participation in all types of Sanitary Service Provision and Mobilize Non-Government Efforts and Resources into the Sector***

- Encourage NGOs to be involved in the provision of sanitation (and in basic services in general) and ensure that the new NGO law alleviates any unnecessary bureaucratic obstacles to their embracing of this role.
- Support the formation of cooperatives in the collection and transportation of wastewater (à la city public transportation cooperatives model) as well as production cooperatives to assist in mobilization of small business resources.
- Involve community representatives in both the choice of and monitoring of decentralized sanitation projects as well as in the choice of models for waste water conveyance arrangements.

***Create Local Economic Opportunities around Manufacturing and Service Needs of the Sector***

- Rely on private sector participation in various operation and management functions of sanitation services and develop the necessary and reasonable regulatory setups.
- Favor, whenever possible, local labor-intensive models in construction and operation of all aspects of service provision.
- Invest in vocational training programs for jobs that arise as a result of the multi-dimensional approach to sector, such as SME opportunities in service workshops, plumbing, manufacturing of parts and small tools and equipment, building of vaults, truck maintenance, etc.
- At the medium scale, introduce to the communities simple, improved and cost-effective technologies related to the manufacturing of insulated septic tanks, biological and chemical substances for treatment and machinery necessary

for the establishment and maintenance of collection and treatment facilities.

- Encourage and maximize re-use of treated wastewater in land reclamation and watering certain crops.
- Ensure economic valuation of excessive use of water to reduce unnecessary burden on networks.

**Sequencing of the Proposed Strategy**

While a main feature of the proposed strategy is the synchronization of its components there are some specific aspects of it that can be initiated right away. These include, for example:

*First*, the government has to present the financial realities of this problem to citizens at the national and the local level and mobilization for a strategy where everybody has a role is emphasized. Especially at the local level, the communities' involvement can be very effective not just in selecting priorities, but also in mobilizing financial and in-kind contributions such as labor, land, volunteerism, etc.

*Second*, the priority that has to be put on upstream vs. downstream prioritization of Upper Egyptian locations. This will have a positive impact on the quality of water travelling downstream as well as give priority to governorates where a large number of the rural poor is concentrated; so the prioritization has the double benefit of being socially, as well as environmentally motivated.

*Third*, it is vital that the experiences of small decentralized sanitation solutions that were implemented be analyzed, lessons learned documented, bureaucratic obstacles addressed, and standardization of successful models to be formally endorsed and the legal and institutional framework for expansion and the financial sustainability of the projects guaranteed.

*Fourth*, work on formalization of informal solutions on the ground into a regulated framework adopted and endorsed by the government is crucial. Even if some incentives may be given to households or small businesses may be necessary. Community participation in this effort is essential.

*Fifth*, prioritization of public expenditure and PPP investment allocation to treatment plants (with more public good characteristics) and less so on pipe networks, where households may have direct benefit of contributing to connection cost, as well as the possible substitution of the system of truck

conveyance of wastewater, in lieu of expensive construction of networks.

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