

Private Sector Participation in the Provision of Urban Water Supply: Examining the Options and Scope in Mumbai

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ABSTRACT: The existing institutional arrangements for water supply in large cities like Mumbai are increasingly coming under pressure from rising demand, increasing complexity of operations and increasing expectation of the people and businesses. Alternate institutional arrangements for improving water management are increasingly sought and private sector participation, in this context, is going to aid in improved water management efficiency. While continuing with ownership of water supply and distribution system, the public agency can utilise the services of private water supplier in asset management and service delivery; in doing so, it can act as regulator of water service provision. This is perhaps an appropriate arrangement to large metropolitan cities wherein service quality consciousness among people is also high. In other words, it also provides scope for increasing value added services and revised pricing methods, thereby, increasing economic value of water. This paper examines the scope and potential for private sector participation in water management in Mumbai. It also discusses an operational framework for such partnership model while underlining the reform areas and directions.

Keywords: Water Supply, Service Delivery, Management Efficiency, Private Sector Participation.

INTRODUCTION

India's urban population has grown rapidly from 218 million in 1991 to 285 million in 2001. However, water supply and sewerage systems in urban areas have not kept pace with growing requirements. At present, 20 percent of urban households do not have access to safe drinking water. In addition, there are large distributional inequities and the quantum of water supply is much below international norms. The situation in sewerage is even worse. The coverage of organised sewerage systems ranges from 75 per cent in Class I cities to a pathetic 35 per cent in Class IV towns. Typically, sewage is not properly treated before being discharged. This shortage in water supply and sewerage services is leading to deterioration in the quality of life. Hence a dramatic improvement in the coverage, quality and quantity of these services is necessary. Therefore, water resource management assumes importance in Indian cities as: (i) increasing scarcity of water resource exerting pressure on its supply to cities (ii) economic development of city increasingly getting linked to the availability of good infrastructure, of which water supply is an important component.

Urban water supply and sewerage are currently provided by different entities in various States—Municipal bodies themselves and Water Supply Boards

and treated as public services. The administrative approach to and non-market framework of providing these services has brought in substantial inefficiencies in the system such as high leakage rates, poor service standards, low meter penetration, theft of water and poor billing and collection. At the city level, the total revenues generated from the Water Tax and User charges do not even cover operations and maintenance (O&M) costs in the case of several cities. This has led to significant degradation of existing assets due to poor maintenance.

A glaring example of inefficiencies in water supply sector is the high level of Unaccounted For Water (UFW) in most cities. In Delhi, the UFW is estimated to be 40 percent and in Mumbai it is more than 30%, as compared to the world norm of about 10-15 percent. The typical approach of several local Governments has been to increase the supply of water. Such an approach, however, requires massive capital investments and then investment on operation and maintenance. The Planning Commission estimates that, to make up the huge backlog in Water Supply and Sewerage sector in the next 10 years, investments to the tune of Rs. 15,000 crore per annum would be required. In contrast, the Eighth Plan provided for a meagre Rs. 5,700 crore for this purpose. Good amount of investment has to come in the form of debt.

This resource gap can be bridged through private sector participation, which the government has encouraged in its plan document and national water policy. This led to expansion of water supply through Build, Operate and Transfer (BOT) agreements with the private sector for bulk water supply schemes. But, the inefficiencies in water distribution has made new investment in the water sector unviable and led to the failure of most of the private sector participation schemes. Therefore, it is imperative that the water supply distribution and service undergo some major changes for making the sector viable and therefore needs to be undertaken in the form of various reforms in the urban water supply distribution and service. With this background, we will discuss the scope and potential for the same in Mumbai. Before that, we will evaluate the status of water supply in Mumbai.

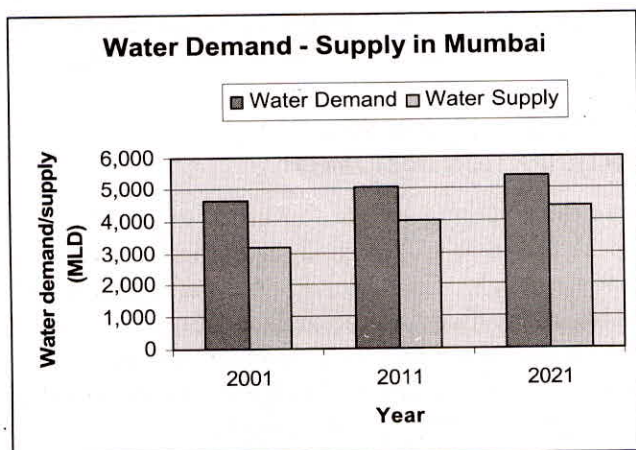
STATUS OF WATER SUPPLY IN MUMBAI

A detailed discussion of water supply status is reserved here, which can be found in Nallathiga (2004). We will discuss the Status of Water Supply provided by Municipal Corporation of Greater Mumbai (MCGM) in terms of:

- Water Balance
- Water Supply
- Service to Poor
- Water Pricing
- Water Service

Water Balance

Mumbai has a gross available water supply of 3, 193 MLD, out of which losses through leakages (including pilferages) make net available water supply 2,320 MLD and this is inclusive of 600 MLD water supply for non-domestic purposes i.e., industry and commerce.



The average gross per capita water supply is 260 litres and the net water available for domestic use is about 155 litres per capita per day (lpcd). Current and future water deficit pattern is evident from the following diagram based on the data from MCGM.

Water Supply

The net available water supply being above the Bureau of Indian Standards (IS) norm of urban water supply laid down at 135 lpcd may make water supply status appear to be satisfactory on the whole. However, the existence of a good number of private water suppliers and a conspicuously large private market for water, the deficits in water supply are not so obvious from the aggregates. Further, some parts of the city do not receive water; some of them receive it intermittently; and some sectors have more privilege in accessing it than others.

Service to Poor

Municipal norms of water supply have been fixed at 45 lpcd in slums, 90 lpcd in chawls and 135 lpcd in high rise buildings, respectively. However, the actual water supply widely varies between wards and even localities within a ward; it varies from 50 lpcd in slums to 250 lpcd in high rise buildings. Most of the poor are still provided with standing tap or common tap for the poor community in chawls and slums.

Water Pricing

Water pricing follows simple uniform volume rate and is different for different sectors. Current pricing does not recognise the necessity and luxury nature of water. Identifying the threshold point of necessity and providing water at low prices in this block and levying higher water tariff for higher water consumption in other block can help it to obtain balance of cost recovery and affordability.

Water Service

Water service is highly concentrated in the hands of MCGM and is transported and distributed through delivery system which is very old in island city. Although water supply is reliably, the service quality is not adequate. The systems and procedures followed for billing, meter reading and client relations is very poor and do not show any elements of corporate functioning. In the absence of close substitutes, it is considered as only source but complemented by bore water in the peripheral areas/suburbs.

MOVING TOWARDS PRIVATE SECTOR PARTICIPATION IN WATER SUPPLY

The above status of water supply in Mumbai clearly implied that the MCGM has been unable to keep up with the demand for water supply arising from rapid pace of growth of the city. This has led to a significant shortage of water, especially in the newly developed areas of the suburbs and the areas peripheral to the city. The MCGM has plans to tackle the problem only by attempting to increase the supply of water through various water projects, but many of them are not going to provide enough water to the city. It has plans for augmenting the water supply capacity 800 mld by 2011 and 450 mld by 2021, but still there will be a shortage in supply.

In addition, leakage reduction plans are in pipeline and leakage points are assessed through various surveys. However, it is not clear how far the leakage reduction is feasible, given that metering of water supply connections has been stagnant. The cost of this water supply is not very high, amounting to around Rs 5/kl as it comes through gravity flow; but it may rise in future. However, the high level of Unaccounted For Water (UFW), estimated at about 30 per cent, is a major problem and this is primarily on account of old pipeline distribution system in the island/central city on one hand and high pilferages in slums and unauthorized colonies on other.

Furthermore, tariffs have been sufficient to account for O&M costs and part of the capital costs (about 40%). But, in order to subsidise domestic users, industrial users are subjected to very high water tariffs of Rs. 35/kl, pushing them to look for alternate sources of water or relocate outside the city. In such a situation, the expanded water resources through projects may not be adequate. In addition, the expansion of the distribution network need to be undertaken in the sub-urbs and it needs to be replaced in city central parts which would require massive investments. Poor quality of water, sewerage and drainage are common problems in the monsoon season, when they assume very critical level of service delivery.

Given the fact there are quantitative imbalances, unsatisfactory service levels and also inadequate institutional arrangements for providing water supply in Mumbai (detailed discussion can be found in Nallathiga, 2004), it is imperative to address these issues through the participation of private sector in water supply—both distribution and service. It is expected that the private sector participation will lead

to overall management efficiency in terms of distribution/supply management, quality management, financial and human resource management, client services and operations management.

The first step towards improving water supply situation in Mumbai is to involve Private Sector Participation (PSP) in the distribution of water supply and its services. A wide range of PSP options are available which range from service contract to concession contract (Box 1 discusses the features of all PSP models that can be utilized in urban water sector together with the role of key players in such partnership). Corporatisation and strengthening of the MCGM water unit can be done using the above contracts first so that it can become a separate body that deals with water supply and service through several process improvements (detailed discussion can be found in Nallathiga 2004).

Involving the private sector in distribution and water charge collection is the next step, wherein private concessionaire can be identified through open competitive bidding in select area(s), where potential for success is very high. An independent Regulatory Authority should be formed to regulate the operation of the privatised utility and set targets for reduction in water losses and improvement in collections. The investments required for rehabilitating and expanding the distribution network should be met by the concessionaire. The State Government should provide legal support to curb theft of water or work out a targeted subsidy scheme with subsidy borne by government.

Decreasing water losses would increase the availability of water for distribution. This can help in reducing the massive investments required in expanding water sources. In the medium term, privatisation would lead to improved coverage of water supply and sewerage services, with a likely reduction in tariffs. Once distribution is made efficient, future augmentation of water resources in the long term would also become viable.

STRATEGISING THE PRIVATE SECTOR PARTICIPATION IN MUMBAI

Given the emerging scenario of urban water supply in general and that of Mumbai in particular, we may discuss strategies for improving the performance that involve alternative institutional structures of private sector participation and the reforming of water supply sector. We also outline the success cases in India as well as abroad to emphasize the same.

Box 1: Public Private Partnership Options in Urban Water Sector

1. Service Contracting

It involves recruiting the private sector to carry out specific operations and maintenance activities, usually for period of few years. With this approach, the public provider sets the performance criteria for the services, which may be based on a lump-sum, unit cost or any other basis. To ensure that contracting-out results in greater efficiency, contracts should be awarded through competitive bidding. Private bids can also be compared against those of the public agency.

The duration of a service contract should be sufficient to allow the contractors to fully write-off the cost of any equipment purchased, such as collection vehicles.

2. Management Contracting

It can be distinguished from service contracting by the amount of responsibility given to the private sector. This agreement moves beyond individual service functions to encompass a fuller range of operations and maintenance. Under a management contract, a private firm manages the operations of a State-owned enterprise without committing its own investment capital or accepting full commercial risks for matters such as tariff collection. International experience shows that two key elements are required for successful management contracting. First, the contractor must be given autonomy to implement reforms. Second, the contract must contain effective incentives for good performance and penalties for failure to meet agreed performance goals; bonuses for exceeding targets should also be incorporated.

In infrastructure enterprises, these incentives are often tied to improving billing and collection and reducing costs and system losses. However, even contracts that exhibit these features have their weaknesses. As management contracts do not require the Government or municipal body to commit to cost-covering tariffs, there is often weak tariff discipline, and in many cases non-payment by the Government or the municipal body itself is a major problem. Furthermore, the contractor does not contribute any investment capital.

Management contracts are generally for a period of three to five years. This allows the private sector operator to implement changes and to be accountable for results. Management contracts are sometimes seen as an attractive option when fuller private participation is not appropriate or where it is expected that a management contractor can help to improve information about the enterprise and its market before further private participation options are considered.

There are, however, problems in using such contracts before undertaking substantial reforms. Contractors with international tie-ups might engage in a management contract in order to secure a privileged position in the subsequent initiatives. To guard against such an eventuality, more than one network needs to be contracted out, including yardstick competition.

<i>Agency</i>	<i>Role</i>
Government/ local body	Legislation Policy
Water Department of Local body	Asset ownership Capital expenditure monitoring and control Setting performance standards Monitoring performance
Management Contractor	Specific services: O&M, Training, billing and collection etc

3. Lease Contract

Under a lease contract, a private firm operates and maintains a Government-owned enterprise at its own commercial risk, with income derived directly from tariffs. The lessee (which is a private firm) is under no obligation to invest in the infrastructure. In fact, the only obligation the lessees under is maintenance—that has to be agreed upon.

In lease contracts, as the contractor would be normally called upon to finance working capital and replacement of short-lived assets, the duration of the contract is usually between six and ten years, corresponding to the amortization (write-off costs) of such works. Leasing requires the Government or the municipal body to commit to tariffs that cover at least operating and maintenance costs, and gives the operator powerful incentives to ensure that tariffs are collected and operating costs are minimized. In this sense, leases constitute a stronger form of private participation than management contracts.

<i>Agency</i>	<i>Role</i>
Government/ local body	Legislation Policy
Water Department of Local body Management Contractor	Asset ownership Capital expenditure monitoring and control Tariff setting
	O&M Working capital financing Customer billing Service standards Spares/ repairs

4. Concessions

Under a concession, the private operator manages the infrastructure facility, operates it at commercial risk, and accepts investment obligations whether to build a new facility or to expand or rehabilitate an existing facility. A typical contract has a fixed term and involves transferring the assets back to the local body at the end of the term, when it may re-bid. Contracts generally run from 25 to 30 years, allowing private operator to recoup invested capital expenditure.

Concession is common model wherein Governments desire private investment but do not want to relinquish rights to ownerships of sector assets in the long term. Concession arrangements also exist for solid waste disposal and treatment. The term 'concession' has various interpretations—it can include private projects constructed under Build-Own-Operate-Transfer (BOOT) and Build-Operate-Transfer (BOT) terms. The BOT type arrangements operated in developing countries mainly involve power and transport projects, and water treatment and supply.

<i>Agency</i>	<i>Role</i>
Government/ local body	Legislation Approvals Underwrite risks (unmanageable by private party)
Water Department of Local body	Monitoring Control Revenue collection
Management Contractor	Capital expenditure Asset ownership Charge for the services Performance

Source: GoM (2001)

Shifting the Focus from Expanding Water Supply to Improving Distribution

Water supply service is wholly based on the supply expansion thinking and planning in Mumbai, whereas Demand management is considered as the critical element of urban water management in future. Eliminating the inefficiencies in the distribution system, utilizing economic instruments like tariffs and optimal utilization of water resources can significantly reduce the investments required for expanding supply. This will require following steps:

(a) Privatise Distribution of Water and Sanitation Services

The water supply department does not have the financial autonomy to mobilize resources; neither, it has the managerial and technical knowledge required to make significant improvements in water distribution system. Hence, it is necessary to take the assistance of the private sector in improving the system. This will require the following actions:

1. *Secure Private Participation through Concession Contracts:* Under such contracts, the private partner is given complete responsibility for Operations and Maintenance (O&M) as well as new investments required. The commercial risks are also passed on. This not only reduces leakages

in the system and improves collections, but also completely eliminates the need for any new investment from the government in the expansion and O&M of water utilities. Rosenthal and Alexander (2003) show that this will also benefit the poor in an expanding network given the private player's attempt to drive down costs and increase revenue through increased network coverage.

2. *Award Projects through Competitive Bidding:* The Concessions should be awarded through competitive bidding, which will not only bring in efficient cost plus bid but also give chance to bidder to evaluate the risks carefully. The main criterion for selection should be the tariff that the bidder proposes to charge, while providing mandated service levels and investment targets. In the long term, to satisfy the needs of the ever-growing population, the supply of water will have to be augmented and this can be made conditional in incremental manner. Therefore, the company with the Concession contract would also be responsible for investing in enhancing the bulk supply. However, to bring in competition in capacity construction, an open tender should be floated for the construction of these projects.

Box 2 provides a case study of the privatisation of a public water utility in Buenos Aires through a Concession Agreement. This has provided clear benefits in terms of improved coverage and lower prices.

Box 2: Privatisation Success through a Concession Agreement in Buenos Aires

Buenos Aires' public water utility has been successfully privatised through a Concession Agreement in 1993, leading to definite improvements in coverage, reliability and reduced prices for water and sewerage services.

Status of Utility

Obras Sanitarias de la Nacion (OSN), the government owned water and sewerage utility in Buenos Aires, was producing 3.7 million cubic meters of water a day. Even at this level of production, it served only about 70 percent of the area's population; sewerage coverage was even lower, at about 58 percent of the population. Poor maintenance led to significant water losses, estimated to be about 40 percent.

Objectives behind Privatisation

The main objectives of the privatisation were to:

- Reduce the public investments required in operating and augmenting the services
- Minimise the price for service delivery.

Approach towards Privatisation

The government decided to award the right to provide services under a concession agreement, thus keeping the fixed assets under public ownership. The concession was provided for 30 years, allowing the private player to recoup his investments. The contract was awarded to the bidder offering the largest discount to the existing

tariffs. The concessionaire was responsible for expanding the coverage of services and developing sewerage treatment. The targets for coverage implied investments of about US \$ 4 billion over the life of the contract.

A new independent agency, Ente Tripartito de Obras y Servicios Sanitarios (ETOSS), was created to regulate the concession contract. The agency was financed through a user fee levied on consumers.

Outcome

The Concession was awarded to Aguas Argentinas, a consortium headed by Lyonnaise des Eaux-Dumez, which offered a tariff discount of 27 percent. The impact of privatisation has been very positive, as shown by the following facts:

- Rehabilitation of the existing system has cut water losses to about 25 percent
- Coverage of the population by water supply has increased by 10 percent without any expansion of water sources
- Coverage of the population by sewerage services has increased by 8 percent
- Despite a recent increase, tariffs are still 17 percent lower than those charged by the public utility before privatisation.

Source: GoI (2003)

(b) Ensure Internal Augmentation of Water Resources

Local authorities along with the private partner should strive for better utilisation of available water. This should be achieved by reducing wastage of water through reduction in UFW and the recycling of water through proper treatment. The following table illustrates how leakage detection needs to be strategised by asking various questions. Rain water harvesting is becoming an integral part of the water conservation strategy in several cities that are mandating it for fresh building permissions. Recycling will have multiple benefits: improving the quality of discharged water and reusing part of the treated water for applications in industries, watering of parks, etc. Likewise, recycling within residential and industrial premises should be encouraged so that more productivity can be obtained from every drop of water. In the US, on an average, water is used three to four times in industries before it is discharged.

Question	Task
How much water is being lost?	Undertake Water balance: <ul style="list-style-type: none"> • improved estimation/ measurement techniques • meter calibration policy • meter checks • identify improvements to recording procedures
Where is being lost from?	Network audit: <ul style="list-style-type: none"> • leakage studies • operational/customer investigations
Why is it being lost?	Review of network operating practices: <ul style="list-style-type: none"> • Investigate historical reasons, poor practices, quality management procedures, material/infrastructure,

How to improve performance?	Upgrading and strategy development: <ul style="list-style-type: none"> • update records systems • introduce zoning • introduce leakage monitoring • address causes of apparent losses • initiate leak detection/ repair policy • design short to long term action plans
How to maintain strategy?	Policy change, training and O&M Training—improve awareness, increase motivation, transfer skills, introduce best practice O&M—community involvement, water conservation and demand management, action plan, O&M procedures

Source: Farley and Liemberger (2005).

(c) Ensure Water Conservation through an Appropriate Tariff Structure

The existing highly subsidised water tariffs do not provide any incentive for conserving water. Even these tariffs are mostly levied as fixed prices, such as the Water Tax or User charges based on the number of outlets in slums and chawls, which are inefficient. To promote the conservation of water, it is necessary to introduce rational pricing and user tariffs based on metered supply. Further efforts to optimise consumption should include:

- *Telescopic Charges*: This would entail charging higher tariffs at higher consumption levels
- *Seasonal Tariffs*: This would mean charging higher tariffs in summer.

Formulate Policies to Support Private Sector Participation

To attract private investment and know-how in the water sector and gain the best benefits from such an association, the government needs to create an appropriately structured and well-governed policy that supports the operations of private sector upon transfer. This should be achieved through the following initiatives:

(a) Set up an Independent Regulatory Authority

To regulate the various Concession Agreements, regulatory bodies should be formed at the State level for tariff fixation, setting performance standards and monitoring service standards and capital investment plans. This regulatory authority can also have representation of citizens and experts in the profession so that they are designed with best possible agreement on tariff structure appropriate from view point of cost recovery and profit as well as affordability. It can also lay down service standards on the concessionaire, resort to economic regulation (rate of return or profit) and promote yardstick competition with similar bodies as in the case of the US (Haarmeyer, 1992).

(b) Rationalise Tariffs

To make the utility sustainable, the tariffs charged to the customer should be raised to full cost recovery level in a phased manner. Increase in tariffs should be linked to simultaneous improvements in service delivery. Tariff charges shall be designed to protect the poor as well as recover costs and profits, which is best done through two-part tariff systems, under which low price is charged to poor and high price to the rich.

Cross subsidies should be limited to a rational level between the users to avoid leakages and transfers. Also, this will allow lower rates for domestic users

without pushing industrial users to look for alternate and sub-optimal sources of water. Additional subsidies for the poor and low income communities or those provided to any segment should be reimbursed by the State Government through budgetary support.

(d) Bundle Water Assets

The urban water utility to be given out on concession needs to have both the bulk water supply and the distribution assets along with a proper mix of domestic and industrial clients. Therefore, water infrastructure assets have to be bundled through the following measures before transferring to the private party involved in the partnership:

1. *Integrate Bulk Water Supply and Distribution Assets:* The bulk supply of water is done by the State Government parastatal Maharashtra Jeevan Pradhikaran, whereas the O&M is provided by the municipal corporation. For Concessions in such cases, it would be necessary to bundle together the bulk water supply and water distribution assets, so that the fixed and variable costs can be clearly identified and distributed optimally to the required levels of management.
2. *Create a proper mix of Domestic and Industrial Clients:* To create a self sustainable utility with necessary cross subsidies to the domestic user, there is a need for a proper mix of domestic and industrial customers. Hence predominantly domestic areas need to be packaged along with neighboring industrial areas and suburbs. The existing non-networked areas need to be identified and taken up in a phased manner.

Box 3 provides a case study of private sector participation in the Tirupur Water Supply and Distribution Project. As can be seen, control over distribution and revenue collection and rational tariffs have played a significant role in this pioneering initiative.

Box 3: Tirupur Water Supply and Distribution Project

The Tirupur project can be looked upon as a successful example of private sector participation in the water sector in India. A Special Purpose Vehicle, New Tirupur Area Development Corporation Limited (NTADCL), was promoted by the Tamil Nadu Corporation for Industrial Development (TACID), the Tirupur Exporter's Association and Infrastructure Leasing & Financial Services Limited, to supply water for industrial and domestic consumption. The main factors of the progress of this initiative are:

Distribution and Revenue Collection by Promoter Company

The distribution of water and revenue collection is handled by NTADCL. This will help it achieve high efficiencies in the distribution segment.

Rational Tariffs

All costs are recovered through user charges. The cross-subsidisation from a high percentage of industrial consumers help keep the domestic tariffs at low levels.

Concession Agreement for a 30 year period

The 30 year concession agreement provides the operator enough time to recover his investments. A noteworthy fact is that there are no sovereign guarantees for this project, though there is a 'take or pay' arrangement with the Municipal Corporation.

Public-Private Participation

The presence of public sector companies amongst the promoters conveys the commitment of the Government to the project. It is also likely to lead to greater co-operation between the promoters and other government agencies.

Competition in Investment

The EPC contract for project construction has been given to the M&M-Bechtel-United Utilities consortium through an open tender. This minimised the cost of the project.

Source: GoI (2003).

SUMMARY

Water supply and service in Mumbai do not point to a sustainable system given the imbalances and service deficiencies. This can be overcome by involving private sector in the water supply system first through corporatisation model and then involve it fully in the service delivery (as being done in a ward as a showcase project now). In order to provide the necessary water supply and sewerage services on a sustainable basis, the local government i.e., MCGM, needs to take the transitioning steps with the involvement of private sector participation, as is being attempted now:

- (a) Shifting the focus of reforms from expanding the water supply to improving distribution through
 - (i) privatising the distribution of water and sanitation services
 - (ii) augmentation of water resources through internal sources
 - (iii) water conservation through an appropriate Tariff Structure.
- (b) Formulate Policies to attract and support Private sector participation through
 - (i) setting up an independent regulatory authority
 - (ii) rationalising tariffs
 - (iii) bundling water assets.

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