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## Dual water supply system as a way to better resources utilization. The case of Paris.

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**Theme 5:** ALTERNATIVE WATER SUPPLY AND WASTEWATER TREATMENT/DISPOSAL

### Abstract.

The rarefaction of the water resources and the degradation of their quality are a major challenge of the 21st century. France, although it has important water reserves, is not free from these problems. As most industrialized countries, France uses great quantities of water of its rivers and its water ground water for drinkable water supply, but also for industrial processes, of urban cleaning and irrigation which, in theory do not require a high water quality. These processes could be satisfied by non potable water like raw water, the rainwater or recycled water like treated effluents. Like rainwater harvested and used for toilet flushing, alternative resources to drinking water could be used for other urban uses such as green spaces watering or roadways cleaning.

The use of non potable water not only makes it possible to preserve the natural resources, by avoiding in situ extraction, but improves also the sustainability of the urban system by limiting energy consumption necessary for extraction, treatment and transportation. In case of domestic effluent reuse for watering and irrigation also nutrients like phosphorus and nitrogen are saved.

In Europe 1 billion m<sup>3</sup> (2.4% of total use) are re-used, mainly in the countries like Spain, Italy and Greece. In France recycling is limited to agriculture (Clermont Ferrand, Achères,...) or to irrigation of golf course. In Europe Spain is one of the rare countries using reclaimed water for urban purposes as street cleaning. Nevertheless in France we can find several cities like Paris, Nice and Lyon using raw water for non potable urban services.

If we consider the usual urban water cycle, we can observe a linear use starting with extraction usually upstreams of the urbanized area, passing by potabilisation in peripheral area, in city use and waste water treatment and discharge downstream of the urban area. The agricultural re-use can be seen as ultimate step of treatment and a point to point application. An urban re-use however, obliges to reconsider the trajectory of water. The return of water downtown or cyclic use, requires a specific delivery system. Some cities like Madrid or Hong

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Kong with an important hydric stress has implemented such a dual system. Though cities owning already a dual system due to historical practices of different water type use (application of treated raw water for private inside uses and non treated water for collective outside uses), can optimize their dual system according to all available non potable resources.

The recent re-municipalization of water services in 2012 in Paris and the on going rehabilitation of its non-drinkable water supply network give to Paris the possibility to exploit other resources like ground water pumped from metro system and treated domestic waste water. The use of alternatives urban resources incontestably requires an adaptation of the uses and their organization.

The presentation proposes a schematic overview and first analysis of the existing resources in the urbanized perimeter of Paris, the actual and potential uses and a selection of possible modifications of the flows on global and local scale. The data used were collected in 2012 after the re-municipalization in the framework of research programmes PIRVE and OPUR4 within the technical services of the Paris municipality, the new public distribution company Eau de Paris and field surveys. The data are treated with flow chart programs and GIS. Based on preliminary interviews with the principal actors the article will present first insights in organizational and institutional bottlenecks linked to new uses and supply schemes.

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