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MEXICO WATER REPORT

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Public & Private Water Treatment Plants in Mexico

Like many developing countries, Mexico faces the problem of water shortages and inadequate water treatment technology and infrastructure. Mexico currently treats only 40% of its municipal wastewater. Of even greater concern is the fact that only 10% of the municipal wastewater is treated currently in the Greater Mexico City Area and none of the municipal wastewater in Mexico's second most important city, Guadalajara, is currently treated.

Of equal concern, in relation to wastewater treatment needs, is the fact that of the 653 aquifers in the country, 104 are considered to be overexploited and 68 are on the verge of overexploitation. In light of these problems with 30% of Mexico's aquifers and the limited availability of water, especially in the northern part of the country, the Mexican government is making treatment and reuse activities a priority so that it can meet its goal of 60% wastewater treatment by 2012 and the more lofty goal of 100% treatment by 2030.

Mexico has recently announced several major projects that will help alleviate some of these problems. It looks as if Mexico could have 2000 wastewater treatment plants in operation by the end of the year. Following is a review of the current public and private sector treatment plant infrastructure in the country, and a discussion of the trends for treatment plants during the next few years.

Since 1992, the number of municipal wastewater treatment plants has increased more than 450% from just under 400 plants to 1833 in 2008. From 1992 through 2000, treatment plant construction increased by just under 100%, while from 2000 to 2008, Mexico had a much more dynamic 230% increase. However, most of this increase appears to have come during the Fox Administration (2000-2006) rather than during the first part of the Calderon Administration (2006 - present). Since 1995, when installed capacity began to be monitored in Mexico, this indicator has increased by over 235% . Likewise, the amount of actual treated wastewater has increased from just over 30 m3 per second in 1992 to 83.6 m3 per second in 2008, representing a 275% increase.

Municipal Wastewater Treatment Plants 1992-2008			
Year	**Treatment Plants**	**Installed Capacity (l/s)**	**Treated Volume (l/s)**
1992	394	nd	30,554.0

1993	454	nd	30,726.0
1994	461	nd	32,065.0
1995	469	48,172.0	32,905.2
1996	595	51,696.3	33,745.4
1997	639	57,401.7	39,388.8
1998	727	58,560.2	40,854.7
1999	777	61,559.0	42,396.8
2000	793	68,970.0	45,927.3
2001	938	72,852.6	50,810.0
2002	1077	79,735.0	56,148.5
2003	1182	84,331.5	60,242.6
2004	1300	88,718.3	64,541.9
2005	1433	95,774.3	71,784.8
2006	1593	99,764.2	74,388.3
2007	1710	106,266.7	79,388.3
2008	1833	113,024.0	83,639.6

The below table shows the municipal wastewater treatment plants by state, providing a better understanding of where coverage and capacity are greatest at this moment in Mexico. The sparsely populated state of Durango, located in a somewhat dry area in northern Mexico, has the most municipal treatment plants in operation (167), representing almost 10% of all of the plants in Mexico. Sinaloa (136) has the second most plants and Chihuahua (119), also a very dry state, has the third most plants. Somewhat surprisingly, the Mexico City/State of Mexico area, where close to 25% of the Mexican population is located and where wastewater issues are most severe, has only 105 total plants in operation. While the second most important population area, the Greater Guadalajara area, has a comparable 96 treatment plants, this area has only 1/3 of the population of the Valley of Mexico, which makes the Mexico City situation look even more severe.

At first glance, the low number of plants (61, 14th by state) in the third most populated urban center, Monterrey, would seem to be problematic as well. However, the state of Nuevo Leon, where Monterrey is located, has the highest installed capacity (13,244 l/s), treats the most amount of municipal wastewater (11,645 ls) and is only one of two states that reportedly treats all of its municipal wastewater. In fact, the only other states that treat more than 2/3 are Baja California (93%), Chihuahua (71%), Sinaloa (68%), and Quintana Roo/Cancun (67%). The 10 states with less than 25% of municipal wastewater treatment coverage, all of which should be targets for considerable future wastewater treatment activity, are:

- Yucatan (2.1%)
- Campeche (3.8%)
- Hidalgo, where all Mexico City wastewater currently is directed (7.5%)

- Zacatecas (12.1%)
- Federal District/Mexico City (12.9%)
- Tabasco (18.3%)
- Morelos (18.9%)
- Queretaro (22.7%)
- Jalisco/Guadalajara (24.7%)
- State of Mexico (21.1%)

While the very important State of Mexico has a relatively low number of plants and low percentage of total treatment coverage, it nonetheless has the third most installed capacity (7,090 l/s) and the fourth most volume treated (5,190 l/s). On the other hand, installed capacity and volume treated figures for the Federal District/Mexico City and Jalisco/Guadalajara areas are almost as problematic, demonstrating clearly the extent of the problem in these two very populous states.

State	Municipal Wastewater Plants			Coverage (%)
	Number of Plants	Installed Capacity (l/s)	Treated Water (l/s)	
Aguascalientes	115	4,232.5	3,470.1	100.0
Baja California	27	6,985.1	5,262.1	92.6
Baja California Sur	18	1,202.5	844.8	44.9
Campeche	13	101.5	61.3	3.8
Chiapas	24	1,508.9	1,356.1	47.2
Chihuahua	119	8,717.6	5,928.4	71.5
Coahuila de Zaragoza	21	4,966.5	3,866.0	51.3
Colima	57	1,541.0	1.001.8	37.8
Distrito Federal	27	6,480.5	3,122.8	12.9
Durango	167	3,550.9	2,671.4	58.9
Guanajuato	60	5,790.4	4,305.6	50.1
Guerrero	40	2,001.3	1,216.7	33.1
Hidalgo	13	325.5	281.7	7.5
Jalisco	96	3,766.5	3,493.5	24.7
Mexico	78	7,090.2	5,190.3	21.1
Michoacan de Ocampo	25	3,557.0	2,473.6	27.0
Morelos	32	1,603.2	1,214.1	18.9
Nayarit	63	2,029.6	1,228.4	60.5
Nuevo Leon	61	13,244.0	11,645.9	100.0
Oaxaca	66	1,510.3	986.1	44.4

Puebla	69	3,023.2	2,426.3	42.7
Queretaro de Arteaga	67	1,119.5	716.2	22.7
Quintana Roo	29	2,076.5	1,600.9	67.0
San Luis Porosi	21	2,124.5	1,740.2	60.1
Sinaloa	136	5,281.1	4,509.9	68.4
Sonora	76	4,447.2	3,092.0	39.6
Tabasco	72	1,850.0	1,309.3	18.3
Tamaulipas	39	5,613.9	4,050.7	59.4
Tlaxcala	52	1,232.4	872.1	58.2
Veracruz de Ignacio de le Llave	92	5,427.6	3,171.0	26.6
Yucatan	13	78.5	68.5	2.1
Zacatecas	45	545.6	461.0	12.1
National Total	1,833	113,024.0	83,639.6	40.2

The following table shows the distribution of municipal wastewater treatment plants by water basin, offering another way to look at the infrastructure and the problem.

No.	Hydrologic Region	Number of Plants in Operation	Installed Capacity (m3/s)	Water Treated (m3/s)
I	Peninsula de Baja California	45	8.19	6.11
II	Noroeste	90	4.54	3.18
III	Pacifico Norte	249	8.38	6.60
IV	Balsas	147	7.6	5.50
V	Pacifico Sur	83	3.17	1.98
VI	Rio Bravo	188	28.32	22.23
VII	Cuencas Centrales del Norte	113	5.19	4.03
VIII	Lerma-Santiago-Pacifico	465	23.17	18.02
IX	Golfo Norte	91	2.91	2.31
X	Golfo Central	127	5.35	3.14
XI	Fontera Sur	97	3.36	2.67
XII	Peninsula de Yucatan	55	2.26	1.73

XIII	Aguas del Valle de Mexico	83	10.60	6.14
Total			113.02	83.64

The Rio Bravo River Basin, is the top basin in terms of the volume of treated water with 26.5% of total treated municipal wastewater. This basin, despite only having the third most number of municipal treatment plants, counts with the greatest amount of installed municipal treatment capacity. This river basin includes the state of Nuevo Leon, one of the most industrial in Mexico, with the highest percentage of municipal wastewater treatment in Mexico.

The Mexican River Basin districts, broken down by the percentage of all of the municipal wastewater treated in the country are:

- Rio Bravo (26.5%)
- Lerma-Santiago-Pacífico (21.5%)
- Pacifico Norte (8%)
- Aguas del Valle de Mexico (7.4%)
- Peninsula de Baja California (7.3%)
- Balsas (6.5%)
- Cuencas Centrales del Norte (4.8%)
- Noroeste (4%)
- Golfo Centro (3.7%)
- Frontera Sur (3.1%)
- Golfo Norte (2.7%)
- Pacifico Sur (2.3%)
- Península de Yucatan (2%)

In the river basins located in the northern and central parts of the country, which include the top five basins listed above, we find over 75% of all treated municipal wastewater. In light of the serious water supply problems in these regions, especially in the arid north, and the high water availability in the southern part of the country, these statistical differences are more than understandable and give a clear idea about where future treatment plant construction can be expected.

While current infrastructure figures might present more concern than assurance about the municipal wastewater treatment plant situation in Mexico, there are some positive signs about recent and upcoming plant plans and new projects. In the last four years, 202 municipal wastewater treatment plants were built and 43 were rehabilitated. At this time, 59 plants are under construction throughout the country. During this year, another 100 plants are scheduled to be built with 36 already being put out to bid during the 1st Quarter. By the end of 2010, Mexico will have over 2,000 treatment plants either operating or under construction. And, when the three most important treatment plants in Mexican history come on line in the next few years (“El Ahogado” and “Agua Prieta” in Guadalajara, and “Atotonilco” in the Valley of Mexico), approximately over 50% of wastewater in the Greater Mexico City area and 100% of the wastewater in the Greater Guadalajara area should be treated. So, while there is a lot more to be done, there is quite a bit of activity and apparent commitment to expanding the wastewater treatment plant base in Mexico.