



SWAN Research

Stated NRW (Non-Revenue Water) Rates in Urban Networks

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Synopsis

This document lists reported NRW rates in various cities worldwide.

Definition

According to the International Water Association, NRW (Non-Revenue Water) is the difference between system input volume, and billed authorized consumption.

NRW Components

- Billed Unmetered consumption (where water meters do not exist)
- Unbilled authorized consumption (unmetered watering, firefighting etc.)
- Apparent losses (water theft and metering inaccuracies)
- Real losses (leaks and bursts)

System Input Volume	Authorized Consumption	Billed Authorized Consumption	Billed Metered Consumption	Revenue Water	
			Billed Un-metered Consumption		
		Unbilled Authorized Consumption	Unbilled Metered Consumption		
			Unbilled Un-metered Consumption		
	Water Losses	Apparent Losses (Commercial Losses)		Unauthorized Consumption	Non Revenue Water (NRW)
				Customer Meter Inaccuracies and Data Handling Errors	
		Real Losses (Physical Losses)		Leakage in Transmission and Distribution Mains	
				Storage Leaks and Overflows from Water Storage Tanks	
		Service Connections Leaks up to the Meter			

Table 1 – Water Balance (AWWA / IWA)

Stated NRW Rates in Urban Networks

An asterisk (*) indicates that the shown NRW rate refers to the entire network operated by the water utility serving the city's network.

City	Country	Stated NRW	Comments
Adana	Turkey	69.0%	
Amsterdam	Netherlands	6.0%	
Athens*	Greece	20.0%	Estimate
Bacolod	Philippines	37.0%	
Baliuag	Philippines	21.0%	
Bangalore	India	36.0%	
Bangkok*	Thailand	34.0%	
Barcelona	Spain	19.0%	
Birmingham*	UK	26.0%	
Bogota	Colombia	41.0%	
Bristol*	UK	16.8%	
Brno	Czech Republic	13.0%	
Bucharest	Romania	46.0%	
Budapest*	Hungary	16.5%	
Cabanatuan	Thailand	25.5%	
Caserta	Italy	38.6%	
Chengdu	China	18.0%	
Chennai	India	12.0%	
Chicago	USA	24.0%	
Copenhagen	Denmark	4.0%	
Cork	Ireland	45.0%	
Delhi	India	53.0%	
Dhaka	Bangladesh	40.0%	
Diyarbakir	Turkey	51.0%	
Dublin	Ireland	40.0%	Estimate
Galsgow*	UK	44.0%	
Geneva	Switzerland	13.7%	
Genova	Italy	29.5%	
Guadalajara	Mexico	33.7%	
Guayaquil	Ecuador	73.0%	
Hai Phong	Vietnam	18.0%	
Hanoi	Vietnam	44.0%	
Helsinki	Finland	17.0%	
Hermosillo	Mexico	35.0%	
Ho Chi Minh	Vietnam	40.0%	
Hong Kong	Hong Kong	25.0%	
Hyderabad	India	50.0%	Estimate
Istanbul	Turkey	30.0%	

Stated NRW Rates in Urban Networks

City	Country	Stated NRW	Comments
Jakarta	Indonesia	51.0%	
Jerusalem	Israel	10.5%	
Katmandu	Nepal	37.0%	
Katowice	Poland	9.0%	
Kayseri	Turkey	45.0%	
Krakow	Poland	14.0%	
Kuala Lumpur*	Malaysia	35.0%	
Larnaca	Cyprus	23.0%	
Lima	Peru	37.0%	
Limassol	Cyprus	14.8%	
Lódz	Poland	14.0%	
London	UK	28.0%	
Lublin	Poland	10.0%	
Madrid	Spain	12.0%	
Manila East	Philippines	13.5%	
Manila West	Philippines	53.0%	
Melbourne	Australia	3.0%	
Memphis	USA	16.7%	
Mexico City	Mexico	37.0%	
Milan*	Italy	10.4%	
Monterrey	Mexico	31.4%	
Montreal	Canada	40.0%	
Nairobi	Kenya	34.0%	
Naples	Italy	35.0%	
New York	USA	10.0%	
Norwich*	UK	18.2%	
Nymburk	Czech Republic	13.2%	
Osaka	Japan	7.0%	
Oslo	Norway	22.0%	
Ostrava	Czech Republic	21.1%	
Rawalpindi	Pakistan	46.0%	
Rome	Italy	37.8%	
San Diego	USA	8.0%	
San Jose	USA	5.0%	
Santiago	Argentina	15.0%	
Santiago*	Chile	25.0%	
Sao Paulo	Brazil	38.0%	
Seoul	Korea	25.0%	
Shanghai	China	17.0%	
Singapore	Singapore	4.0%	



Stated NRW Rates in Urban Networks

City	Country	Stated NRW	Comments
Sofia	Bulgaria	62.0%	
Stockholm	Sweden	15.0%	
Tokyo	Japan	8.0%	
Toronto	Canada	10.0%	
Vienna	Austria	8.5%	
Warsaw*	Poland	20.0%	
Windhoek	Namibia	14.0%	

Table 2: Stated NRW Rates in Urban Networks. Source: SWAN Forum

Stated NRW Rates - Above 20%

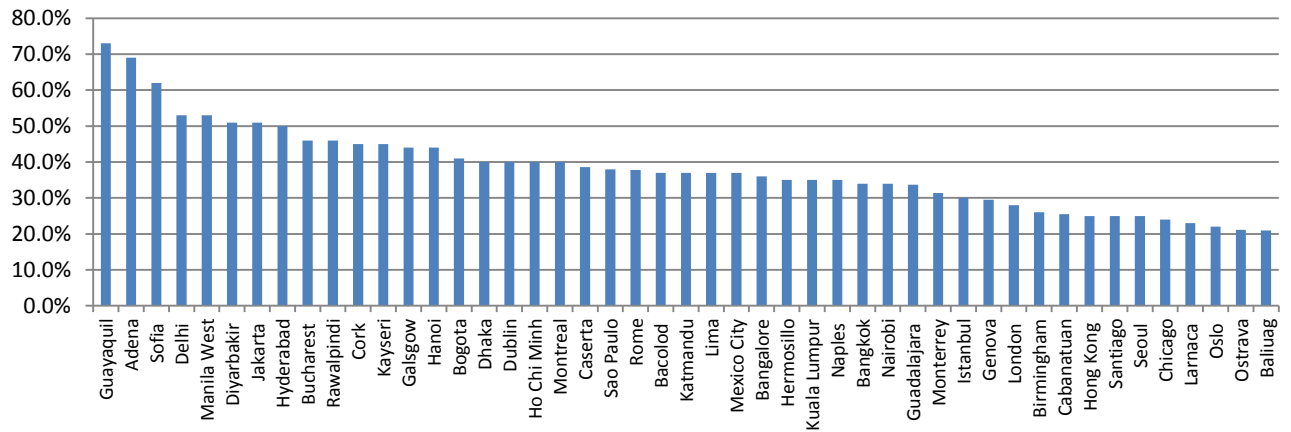


Chart 1 –Stated NRW above 20%

Stated NRW Rates - 20% and under

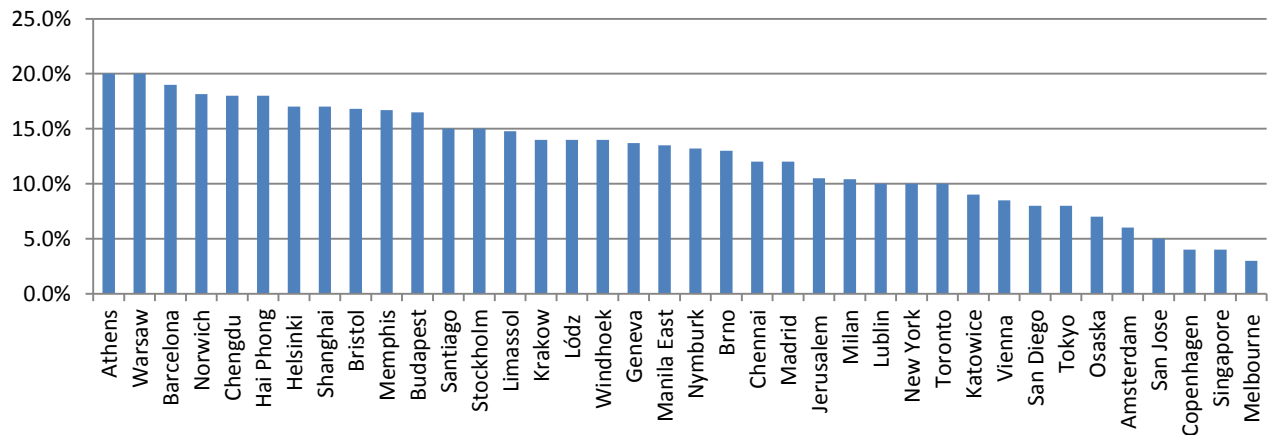


Chart 1 –Stated NRW 20% and under