

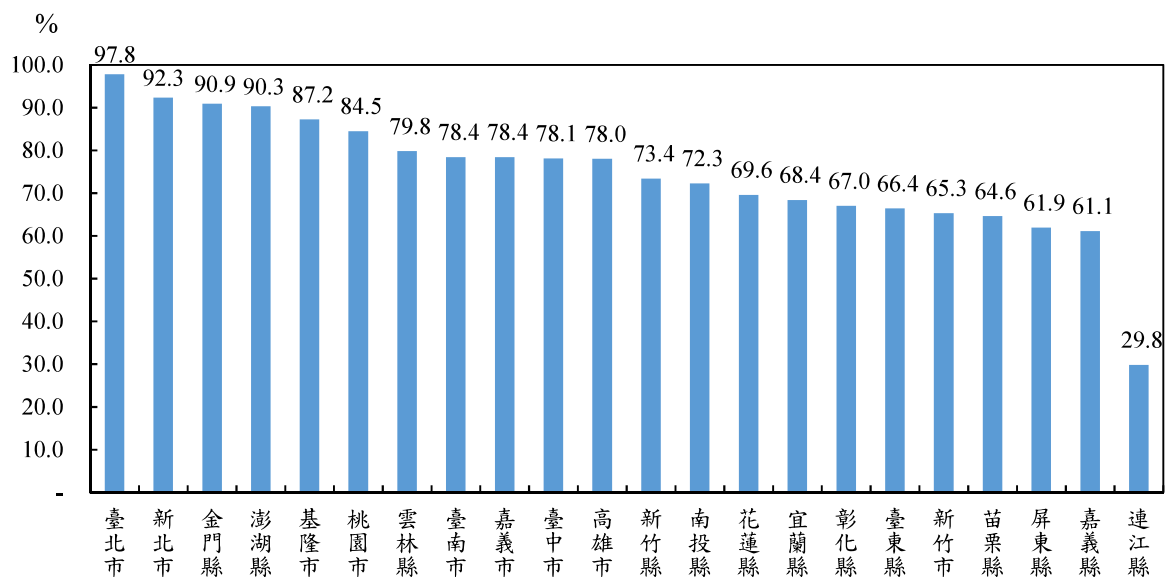
下水道系統之規劃與建設

一、雨水下水道建設

110 年底臺灣地區雨水下水道工程累計規劃幹線長度為 7,096 公里，已完成建設 5,629 公里。若以建設幹線總長度占規劃幹線總長度之比例計算實施率，110 年底臺灣地區雨水下水道建設實施率達 79.3%；其中臺北市實施率 97.8%、新北市實施率 92.3%、金門縣實施率 90.9%、澎湖縣實施率 90.3%、基隆市實施率 87.2%、桃園市實施率 84.5%、雲林縣實施率 79.8%、臺南市實施率 78.4%、嘉義市實施率 78.4%、臺中市實施率 78.1%、高雄市實施率 78.0%、新竹縣實施率 73.4%及南投縣實施率 72.3%，其他縣市都低於七成，有待持續加強建設(詳圖 1 及附表 5-1)。

圖 1 雨水下水道建設實施率

民國 110 年底



二、污水下水道建設

污水下水道係指專供處理家庭污水及事業廢水之下水道，整體污水處理率包括公共污水下水道普及率、專用污水下水道普及率（指規模 100 戶或 500 人以上之社區、工業區）及建築物污水處理設施設置率。污水下水道建設被視為都市現代化程度之重要指標，瑞士洛桑管理學院全球國家競爭力評估報告(IMD)中，污水下水道普及率被列入生活品質評比項目之一，政府也將污水處理率列為污水下水道建設衡量績效指標。

（一）污水處理率

近年少子化等環境變遷因素影響，致每戶平均人口數（戶量）逐年減少。依內政部戶政司資料顯示 103 年底全國戶量僅為 2.80 人，原以戶量「每戶 4 人」推算「公共污水下水道用戶接管普及率」及「污水處理率」之計算基準已不符實際，有關「污水下水道第五期建設計畫(104-109 年度)」業於 103 年 9 月 10 日奉行政院核定，案內修正「公共污水下水道用戶接管普及率」及「污水處理率」二項指標之計算方式，原以「戶數」為統計單位修改為「人口數」。即： $\text{實際服務人口數} \div \text{總人口數} = (\text{實際服務戶數} \times \text{戶量}) \div \text{總人口數}$ ，其中全國部分以當期全國戶量計算，縣市部分以該縣市當期戶量計算。

110 年底，全國整體累積污水處理戶數為 601 萬 7,527 戶，污水處理率為 66.93%，較上（109）年底 64.48% 增加 2.45 個百分點；其中公共污水下水道用戶接管戶數為 357 萬 6,713 戶，普及率為 39.78%，較上年底 37.92% 增加 1.86 個百分點；專用污水下水道用戶接管戶數為 87 萬 8,310 戶，普及率為 9.77%，較上年底之 9.79% 減少 0.02 個百分點；建築物污水處理設施設置戶為 156 萬 2,504 戶，設置率為 17.38%，較上年底之 16.76% 增加 0.62 個百分點。就縣(市)別觀之，污水處理率以新北市最高(93.64%)，其次依序為臺北市(87.44%)、新竹縣(71.84%)、基隆市(71.49%)、臺中市(69.68%)、高雄市(68.82%)、桃園市(68.43%)、新竹市(65.63%)、連江縣(64.24%)、臺南市(58.57%)及宜蘭縣(55.76%)，其餘縣市均未達 50.00%。污水處理量(CMY)為 13 億 846 萬噸，較上年減少 0.7%，以新北市 4 億 5,475 萬噸最高，臺北市 3 億 3,672 萬噸次之、高雄市 2 億 7,508 萬噸再次之(詳表 1、表 2、圖 2 及附表 5-2)。

表 1 污水下水道執行概況

年別	整體污水處理率(%)				污水處理量 (萬噸/年)
	合計	公共污水 下水道 普及率	專用污水 下水道 普及率	建築物 污水處理設施 設置率	
106 年底	55.86	31.96	10.35	13.54	116,514
107 年底	58.10	33.72	10.47	13.91	80,441
108 年底	62.10	36.17	9.99	15.94	133,935
109 年底	64.48	37.92	9.79	16.76	131,749
110 年底	66.93	39.78	9.77	17.38	130,846
110 年底較 109 年底 增減百分比(點)	2.45	1.86	-0.02	0.62	-0.69

備註：

- 100-102 年之普及率及處理率計算方式係依據「污水下水道普及率相關參數及計算公式座談會」研商共識，分母之戶數係依戶政資料總人口除以假設每戶四人而得，其計算公式為：接管戶數(設置戶數)÷(年底人口數÷4)。
- 自 103 年起普及率及處理率計算方式係依據污水下水道第五期建設計畫修正以接管戶數乘以各縣市戶量除以各縣市總人口數而得，其計算公式為：實際服務人口數÷總人口數=(實際服務戶數×戶量)÷總人口數，其中全國部分以當期全國戶量計算，縣市部分以該縣市當期戶量計算。

圖 2 污水下水道處理率
民國 110 年底

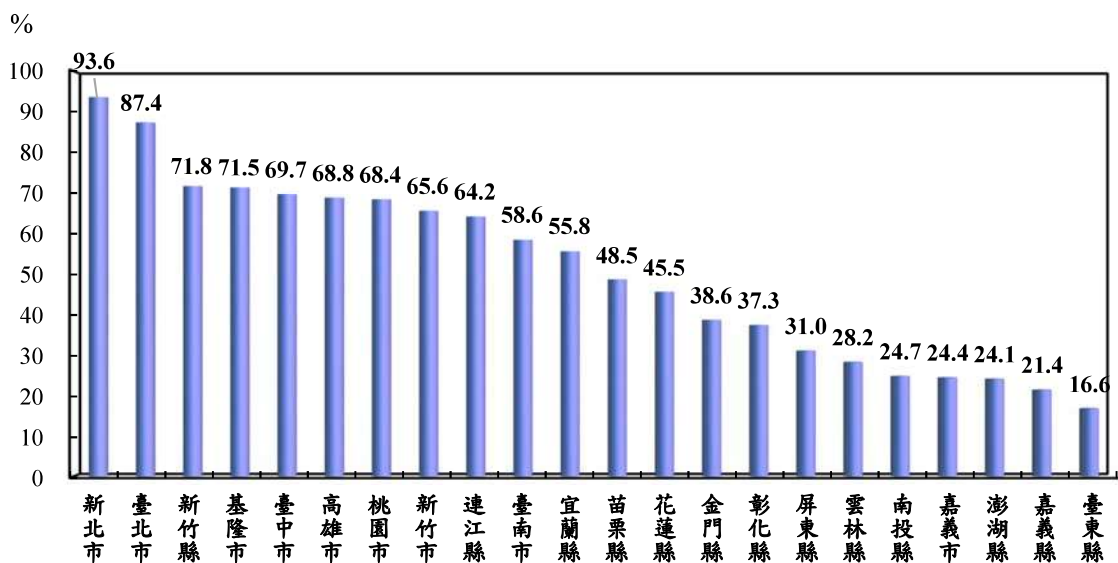


表 2 各縣市污水下水道執行概況
民國 110 年底

年別	整體污水處理率(%)				污水 處理量 (萬噸/年)
	合計	公共污水 下水道 普及率	專用污水 下水道 普及率	建築物 污水處理設施 設置率	
總 計	66.93	39.78	9.77	17.38	130,846
新北市	93.64	69.53	16.56	7.56	45,475
臺北市	87.44	86.20	0.33	0.90	33,672
桃園市	68.43	19.49	23.77	25.17	3,503
臺中市	69.68	24.71	11.27	33.70	5,102
臺南市	58.57	24.30	7.19	27.07	5,823
高雄市	68.82	47.41	5.47	15.93	27,508
臺灣省	41.58	15.43	6.77	19.38	9,437
宜蘭縣	55.76	34.40	5.87	15.49	1,847
新竹縣	71.84	24.31	18.75	28.78	1,102
苗栗縣	48.52	24.28	4.44	19.79	756
彰化縣	37.27	2.71	3.42	31.13	244
南投縣	24.73	6.53	1.92	16.28	133
雲林縣	28.22	5.07	2.00	21.15	409
嘉義縣	21.39	8.63	1.99	10.77	295
屏東縣	31.00	13.37	2.29	15.34	1,647
臺東縣	16.63	3.42	0.62	12.59	78
花蓮縣	45.46	36.95	1.29	7.21	1,508
澎湖縣	24.06	0.81	1.11	22.13	1
基隆市	71.49	39.00	26.14	6.35	470
新竹市	65.63	18.64	20.79	26.21	895
嘉義市	24.40	4.04	3.58	16.78	53
福建省	40.49	39.04	0.15	1.30	325
金門縣	38.55	37.12	0.01	1.41	304
連江縣	64.24	62.48	1.76	0.00	21

- 備註：1. 自 103 年起普及率及處理率計算方式係依據污水下水道第五期建設計畫修正以接管戶數乘以各縣市戶量除以各縣市總人口數而得，其計算公式如下：

$$\text{實際服務人口數} \div \text{總人口數} = (\text{實際服務戶數} \times \text{戶量}) \div \text{總人口數}$$
其中全國部分以當期全國戶量計算，縣市部分以該縣市當期戶量計算。
2. 各縣市戶量係由內政部統計處網站(<http://www.moi.gov.tw/stat/index.aspx>)統計資料而得。

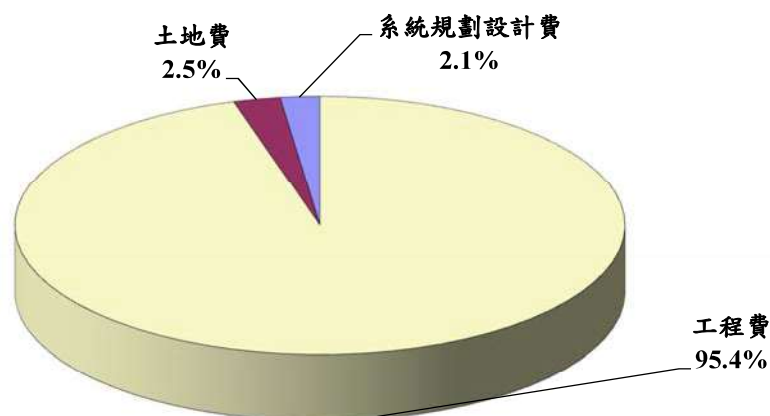
（二）污水下水道建設投入經費

公共污水下水道是都市公共建設，其建設期程長，且需投資龐大經費，展現效益慢，政府平均每年投入之經費超過百億元，而建設經費來源分為政府自辦及民間投資兩部分，政府自辦部分由中央及地方政府編列公務預算辦理。

110 年政府投入污水下水道建設經費共計 147 億 2,898 萬 2 千元，較上年減少 31 億 4,116 萬 7 千元，減幅為 17.6%，其中工程費 140 億 5,594 萬 2 千元(包含廠站工程 32 億 2,567 萬 6 千元及管線工程 108 億 3,026 萬 6 千元)，占 95.4%最多，其次依序為土地費 3 億 6,535 萬 6 千元，占 2.5%，系統規劃設計費 3 億 768 萬 4 千元，占 2.1%；就縣市別觀之，以臺南市投入 26 億 3,354 萬 8 千元最高，新北市投入 23 億 3,864 萬 5 千元次高，臺北市投入 14 億 9,645 萬 5 千元再次之(詳圖 3 及附表 5-4)。

圖3 污水下水道建設投入經費百分比

民國110年



投入經費合計 147 億 2,898 萬 2 千元

（三）污水下水道系統營運管理費用及收入

110 年污水下水道系統之營運管理費用計 34 億 8,919 萬元，較上年之 31 億 5,007 萬 1 千元增加 3 億 3,911 萬 9 千元，增幅為 10.8%，其中以電費 8 億 3,677 萬 3 千占 24.0%最多，人事費 8 億 9 萬 2 千元占 22.9%次之，污泥清運處置費 5 億 3,111 萬 4 千元占 15.2%再次之(詳表 3、圖 4 及附表 5-3)。

另就使用費收入觀之，由於還有部分縣市尚未完成下水道使用費徵收自

治條例之訂定及考量污水下水道用戶接管普及率偏低，目前除台北市、高雄市、新北市及南投縣有向接管用戶收取下水道使用費，臺中市、桃園市、宜蘭縣、嘉義縣、屏東縣、基隆市及新竹市僅針對納管工業用戶徵收使用費外，其餘縣市政府尚未徵收，110 年使用費收入計 22 億 6,864 萬 2 千元，較上年增加 18.3%。

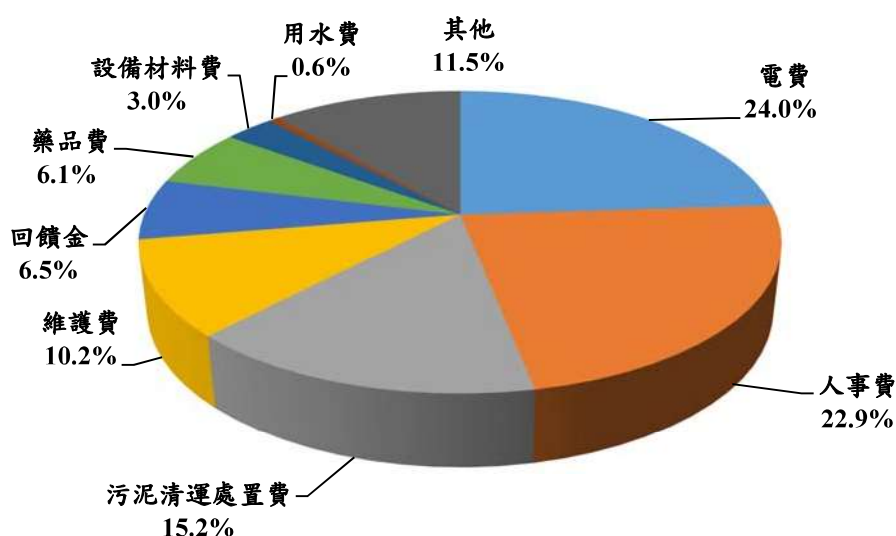
表 3 污水下水道系統營運管理費用及收入

單位：千元，%

年別	總計	人事費	電費	藥品費	設備材料費	維護費	回饋金	用水費	污泥清運處置費	其他	全年度使用費收入
106 年	3,169,423	811,355	920,941	118,516	83,756	211,535	184,187	...	...	839,133	1,661,987
107 年	3,273,165	730,163	885,723	111,886	81,105	238,656	189,724	...	...	1,035,908	1,727,433
108 年	3,335,948	884,004	840,643	136,746	108,575	236,627	192,731	...	...	936,622	1,820,086
109 年	3,150,071	732,307	814,507	218,667	112,249	293,093	233,940	17,651	365,030	362,627	1,917,959
110 年	3,489,190	800,092	836,773	214,501	103,690	357,369	225,285	20,080	531,114	400,286	2,268,642
110 年較 109 年增減(%)	10.8	9.3	2.7	-1.9	-7.6	21.9	-3.7	13.8	45.5	10.4	18.3

圖 4 污水下水道系統營運管理費用百分比

民國 110 年



營運管理費用 34 億 8,919 萬元

(四) 污水下水道計畫管線及設施

就管線長度觀之，110 年底污水下水道管徑 600mm 以上之已建設長度為 128 萬 2,903 公尺，管徑 300mm-未滿 600mm 之已建設長度為 385 萬 5,903 公尺，管徑未滿 300mm 之已建設長度為 715 萬 9,121 公尺。污水處理設施方面，截至 110 年底污水處理廠已建設完成 109 座，抽水站已建設完成 299 座(詳表 4 及附表 5-5)。

表 4 污水下水道計畫已建設之管線長度及設施

年別	管線長度(公尺)			污水處理設施(座)	
	600mm 以上	300-600mm 未滿	300mm 未滿	處理廠	抽水站
106 年底	1,136,148	3,200,324	5,858,735	95	255
107 年底	1,181,031	3,403,691	6,129,073	99	256
108 年底	1,221,843	3,603,312	6,438,231	103	271
109 年底	1,251,252	3,742,759	6,775,277	103	287
110 年底	1,282,903	3,855,903	7,159,121	109	299

Planning construction of sewer system

A. Construction of rainfall drainage system development

By the end of 2021, 5,629 kilometers of the target length of 7,096 in the project of rainfall drainage system construction project in the urban development has completed. If the implementation rate is calculated with the ratio of actual implemented length occupied in the target length, the implementation rate for the rainfall drainage system construction in Taiwan reached 79.3% in 2021. In which, the highest rate is 97.8% in Taipei city, followed by 92.3% in New Taipei City, 90.9% in Kinmen County, 90.3% in Penghu County, 87.2% in Keelung City, 84.5% in Taoyuan City, 79.8% in Yunlin County, 78.4% in Tainan City, 78.4% in Chiayi City, 78.1% in Taichung City, 78.0% in Kaohsiung City, 73.4% in Hsinchu County and 72.3% in Nantou County. The ratio in all other counties and cities is less than 70%, needed to be improved in construction.

B. Sewage sewer construction

Sewage sewers are sewers for family and industrial sewage. The whole sewage treatment rate includes public sewage sewer available rate, special sewage sewer available rate and the implementation rate of building sewage systems. Sewage sewer construction is regarded as an important index for the urban modernization. In World Competitiveness Yearbook reported by International Institute for Management Development , Lausanne (IMD) public sewage sewer available rate was listed in life quality as one of the evaluation items. The government also treats it as the performance index of sewage sewer construction.

(1) Sewage treatment rate

In recent years, the impact of declining birthrate and other environmental changes factors, which led to an annual decreasing of the average number of persons per household. By the end of 2014, nationwide, the average number of persons per household is only 2.80 persons, according to Interior Ministry data indicates. while "Public sewerage sewer available rate" and "sewage treatment rate" two indicators, formerly calculation of the average number of persons per household was "a household of 4 persons", while still using the "a household of 4 people" to estimate these two indicators have been unrealistic, about the "fifth sewerage sewer construction project (104--109 year)", have been approved by the Executive Yuan, on September 10, 2014, the project amend calculation of two indicators,

which are "public sewerage sewer available rate" and "sewage treatment rate", originally set up to "households" as the statistical unit modified to "population." That is: $(\text{Actual service population}) \div (\text{Total population}) = (\text{Actual service households} \times \text{The average number of persons per household}) \div (\text{Total population})$, the above formula, using current national (the average number of persons per household), computing national "public sewerage sewer available rate" and "sewage treatment rate," this two indicators, using current the county (city) (the average number of persons per household), computing the county (city) "public sewerage sewer available rate" and "sewage treatment rate," this two indicators.

By the end of 2021, the number of sewage treatment households nationwide was 6,017,527, and the sewage treatment rate was 66.93% which increases 2.45% in comparison with 64.48% in 2020. The unit number of public sewage sewer was 3,576,713 (39.78% available rate) which increases 1.86% in comparison with 37.92% in 2020; 878,310 units (9.77% available rate) of special sewage sewer (in the scale of 100 units / 500 people or more in the communities and industrial districts) which decreases 0.02% in comparison with 9.79% in 2020 and units with the implementation of building sewage systems are 1,562,504 (17.38% implementation rate) which increases 0.62% in comparison with 16.76% in 2020. In terms of the sewage treatment rate, New Taipei City is the highest (93.64%), followed by Taipei City (87.44%), Hsinchu County (71.84%), Keelung City (71.49%), Taichung City (69.68%), Kaohsiung City (68.82%), Taoyuan City (68.43%), Hsinchu City (65.63%), Lienchiang County (64.24%), Tainan City (58.57%) and Yilan County (55.76%); other counties and cities are not over 50%. The CMY was 1,308,460,457 tons, which decreased 0.7% compared with that in 2020. In which, the CMY in New Taipei City (454,748,700 tones) is the highest, followed by Taipei City (336,724,456 tones) and Kaohsiung City (275,083,567 tones).

(2) Expense of sewage sewer construction

The sewage sewer is urban public construction. The construction period is long and the investment is large. Therefore, the government must invest more than 10 billions in it every year. The construction expense comes from the government and the folk. As for the part of the government, the expense will be processed from the public budget planned by central government and local government.

The total expense of sewage sewer construction was 14,728,982,000 dollars in 2021, indicating an decrease ratio of 17.6% and budget decrement of 3,141,167,000 dollars over the previous year (2020); the highest expense was 14,055,942,000 dollars (95.4%) of construction expense, followed by 365,356,000 dollars (2.5%) of land expense and 307,684,000 dollars (2.1%) of planning design expense. In terms of geological location, the expense of Tainan City 2,633,548,000 dollars, was the highest, and was followed by 2,338,645,000 dollars for New Taipei City, and 1,496,455,000 dollars for Taipei City.

(3) Sewage sewer system management fee and income

The sewage sewer system management fee in 2021 was 3,489,190,000 dollars which increases 10.8% (339,119,000 dollars) in comparison with previous year (2020); the highest expense was 836,773,000 dollars (24.0%) of the power rate fee, followed by 800,092,000 dollars (22.9%) for Personnel fee, and 531,114,000 dollars of Sludge disposal fee (15.2%).

As to the usage fee, some counties and cities have not finished the self-government ordinances in charges of usage fee of sewage. In considering the low piping coverage of sewage, only Taipei City, Kaohsiung City, New Taipei City and Nantou County charge to the users. Taichung City, Taoyuan City, Yilan County, Chiayi County, Pingtung County, Keelung City and Hsinchu City charge to the users in Industry Park, only. Other counties and cities do not charge for it. The usage fee in 2021 was 2,268,642,000 dollars which increased 18.3% compared with that in 2020.

(4) Sewage sewer pipes and facilities

The constructed length of sewage sewer pipe diameter 600mm or above was 1,282,903 meters till the end of 2021. The constructed length of pipe diameter 300mm–600mm was 3,855,903 meters. The constructed length of sewage sewer pipe diameter below 300mm was 7,159,121 meters. In terms of sewage treatment facilities, the constructed wastewater treatment plants was 109 till the end of 2021. The constructed pumping stations were 299.