

SCIENTIFIC AND TECHNICAL offer

Tool for analysing and forecasting demand and prices for urban use water services

DESCRIPTION

Water planning traditionally used to apply hydrological models to determine the demand for water services based on forecasts of future supply needs and population growth. The supply needs parameter used to be estimated in terms of growth compared to the current situation at the time, which encouraged policies of increasing water supplies and catchment infrastructures.

However, the demand for water services depends on a series of globally interrelated **variables: Population growth** or increasing numbers of water service users, higher earnings or **economic activity**, water service **price** levels and the degree of **technical efficiency** in water use or **changes in user behaviour**.

IMDEA WATER SOLUTIONS - University of Alcalá: WaTaPro (Water Tariffs Prospective) model

The WaTaPro model is a management tool for analyzing demand for water services for urban use, and the corresponding tariffs. It is based on a simulation that aims to optimize financial cost-revenue flows, depending on the behavior of certain variables.

The tool consists of two parts:

- **Situation summary**, where we define the main parameters and assumptions used to make the simulation calculations, taking into account the recovery of investment, running, maintenance and preservation costs, as well as the structure and tariff levels. The scenarios also consider parameters such as “Social discount rate” and “Technological change rate”, which must be set prior to calculation.

RESUMEN DE ESCENARIOS																																																																																																																																																									
Recuperación de costes																																																																																																																																																									
Centro de inversión		Año Base		Parámetro a recuperar		Centro de explotación		Sector beneficiario																																																																																																																																																	
Inversión de la inversión		2015		Sector Industrial		287000		Sector Industrial																																																																																																																																																	
Porcentaje de beneficio a recuperar		30		Sector Servicios		30		Sector Servicios																																																																																																																																																	
<table border="1"> <thead> <tr> <th colspan="3">Reservas</th> <th colspan="3">Reservas</th> <th colspan="3">Reservas</th> <th colspan="3">Reservas</th> </tr> <tr> <th>Concepto</th> <th>Tarifa</th> <th>Valor</th> <th>Concepto</th> <th>Tarifa</th> <th>Valor</th> <th>Concepto</th> <th>Tarifa</th> <th>Valor</th> <th>Concepto</th> <th>Tarifa</th> <th>Valor</th> </tr> </thead> <tbody> <tr> <td>Tramo 1</td> <td>10 mm</td> <td>1000</td> <td>Tramo 1</td> <td>10 mm</td> <td>1000</td> <td>Tramo 1</td> <td>10 mm</td> <td>1000</td> <td>Tramo 1</td> <td>10 mm</td> <td>1000</td> </tr> <tr> <td>Tramo 2</td> <td>15 mm</td> <td>1000</td> <td>Tramo 2</td> <td>15 mm</td> <td>1000</td> <td>Tramo 2</td> <td>15 mm</td> <td>1000</td> <td>Tramo 2</td> <td>15 mm</td> <td>1000</td> </tr> <tr> <td>Tramo 3</td> <td>20 mm</td> <td>1000</td> <td>Tramo 3</td> <td>20 mm</td> <td>1000</td> <td>Tramo 3</td> <td>20 mm</td> <td>1000</td> <td>Tramo 3</td> <td>20 mm</td> <td>1000</td> </tr> <tr> <td>Tramo 4</td> <td>25 mm</td> <td>1000</td> <td>Tramo 4</td> <td>25 mm</td> <td>1000</td> <td>Tramo 4</td> <td>25 mm</td> <td>1000</td> <td>Tramo 4</td> <td>25 mm</td> <td>1000</td> </tr> <tr> <td>Tramo 5</td> <td>30 mm</td> <td>1000</td> <td>Tramo 5</td> <td>30 mm</td> <td>1000</td> <td>Tramo 5</td> <td>30 mm</td> <td>1000</td> <td>Tramo 5</td> <td>30 mm</td> <td>1000</td> </tr> <tr> <td>Tramo 6</td> <td>40 mm</td> <td>1000</td> <td>Tramo 6</td> <td>40 mm</td> <td>1000</td> <td>Tramo 6</td> <td>40 mm</td> <td>1000</td> <td>Tramo 6</td> <td>40 mm</td> <td>1000</td> </tr> <tr> <td>Tramo 7</td> <td>50 mm</td> <td>1000</td> <td>Tramo 7</td> <td>50 mm</td> <td>1000</td> <td>Tramo 7</td> <td>50 mm</td> <td>1000</td> <td>Tramo 7</td> <td>50 mm</td> <td>1000</td> </tr> <tr> <td>Tramo 8</td> <td>65 mm</td> <td>1000</td> <td>Tramo 8</td> <td>65 mm</td> <td>1000</td> <td>Tramo 8</td> <td>65 mm</td> <td>1000</td> <td>Tramo 8</td> <td>65 mm</td> <td>1000</td> </tr> <tr> <td>Tramo 9</td> <td>80 mm</td> <td>1000</td> <td>Tramo 9</td> <td>80 mm</td> <td>1000</td> <td>Tramo 9</td> <td>80 mm</td> <td>1000</td> <td>Tramo 9</td> <td>80 mm</td> <td>1000</td> </tr> <tr> <td>Tramo 10</td> <td>100 mm</td> <td>1000</td> <td>Tramo 10</td> <td>100 mm</td> <td>1000</td> <td>Tramo 10</td> <td>100 mm</td> <td>1000</td> <td>Tramo 10</td> <td>100 mm</td> <td>1000</td> </tr> </tbody> </table>										Reservas			Reservas			Reservas			Reservas			Concepto	Tarifa	Valor	Concepto	Tarifa	Valor	Concepto	Tarifa	Valor	Concepto	Tarifa	Valor	Tramo 1	10 mm	1000	Tramo 1	10 mm	1000	Tramo 1	10 mm	1000	Tramo 1	10 mm	1000	Tramo 2	15 mm	1000	Tramo 2	15 mm	1000	Tramo 2	15 mm	1000	Tramo 2	15 mm	1000	Tramo 3	20 mm	1000	Tramo 3	20 mm	1000	Tramo 3	20 mm	1000	Tramo 3	20 mm	1000	Tramo 4	25 mm	1000	Tramo 4	25 mm	1000	Tramo 4	25 mm	1000	Tramo 4	25 mm	1000	Tramo 5	30 mm	1000	Tramo 5	30 mm	1000	Tramo 5	30 mm	1000	Tramo 5	30 mm	1000	Tramo 6	40 mm	1000	Tramo 6	40 mm	1000	Tramo 6	40 mm	1000	Tramo 6	40 mm	1000	Tramo 7	50 mm	1000	Tramo 7	50 mm	1000	Tramo 7	50 mm	1000	Tramo 7	50 mm	1000	Tramo 8	65 mm	1000	Tramo 8	65 mm	1000	Tramo 8	65 mm	1000	Tramo 8	65 mm	1000	Tramo 9	80 mm	1000	Tramo 9	80 mm	1000	Tramo 9	80 mm	1000	Tramo 9	80 mm	1000	Tramo 10	100 mm	1000	Tramo 10	100 mm	1000	Tramo 10	100 mm	1000	Tramo 10	100 mm	1000
Reservas			Reservas			Reservas			Reservas																																																																																																																																																
Concepto	Tarifa	Valor	Concepto	Tarifa	Valor	Concepto	Tarifa	Valor	Concepto	Tarifa	Valor																																																																																																																																														
Tramo 1	10 mm	1000	Tramo 1	10 mm	1000	Tramo 1	10 mm	1000	Tramo 1	10 mm	1000																																																																																																																																														
Tramo 2	15 mm	1000	Tramo 2	15 mm	1000	Tramo 2	15 mm	1000	Tramo 2	15 mm	1000																																																																																																																																														
Tramo 3	20 mm	1000	Tramo 3	20 mm	1000	Tramo 3	20 mm	1000	Tramo 3	20 mm	1000																																																																																																																																														
Tramo 4	25 mm	1000	Tramo 4	25 mm	1000	Tramo 4	25 mm	1000	Tramo 4	25 mm	1000																																																																																																																																														
Tramo 5	30 mm	1000	Tramo 5	30 mm	1000	Tramo 5	30 mm	1000	Tramo 5	30 mm	1000																																																																																																																																														
Tramo 6	40 mm	1000	Tramo 6	40 mm	1000	Tramo 6	40 mm	1000	Tramo 6	40 mm	1000																																																																																																																																														
Tramo 7	50 mm	1000	Tramo 7	50 mm	1000	Tramo 7	50 mm	1000	Tramo 7	50 mm	1000																																																																																																																																														
Tramo 8	65 mm	1000	Tramo 8	65 mm	1000	Tramo 8	65 mm	1000	Tramo 8	65 mm	1000																																																																																																																																														
Tramo 9	80 mm	1000	Tramo 9	80 mm	1000	Tramo 9	80 mm	1000	Tramo 9	80 mm	1000																																																																																																																																														
Tramo 10	100 mm	1000	Tramo 10	100 mm	1000	Tramo 10	100 mm	1000	Tramo 10	100 mm	1000																																																																																																																																														

- **Results** - after calculation, the outcomes are generated by user typology. The development of the rated items (service fees and consumption quotas by section) is presented for each year within the simulation horizon, along with the number of users and the volume billed.

RESULTADOS											
Año	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	
Reservas											
Parte fija de la cuota											
Concepto	Crecimiento										
Tramo 1	10 mm	10,001	10,531	11,061	11,591	12,121	12,651	13,181	13,711	14,241	14,771
Tramo 2	15 mm	10,001	10,531	11,061	11,591	12,121	12,651	13,181	13,711	14,241	14,771
Tramo 3	20 mm	11,301	11,801	12,301	12,801	13,301	13,801	14,301	14,801	15,301	15,801
Tramo 4	25 mm	-	-	-	-	-	-	-	-	-	-
Tramo 5	30 mm	-	-	-	-	-	-	-	-	-	-
Tramo 6	40 mm	-	-	-	-	-	-	-	-	-	-
Tramo 7	50 mm	-	-	-	-	-	-	-	-	-	-
Tramo 8	65 mm	-	-	-	-	-	-	-	-	-	-
Tramo 9	80 mm	-	-	-	-	-	-	-	-	-	-
Tramo 10	100 mm	-	-	-	-	-	-	-	-	-	-
Parte variable de la cuota											
Concepto	Crecimiento										
Tramo 1	0,431	0,491	0,551	0,611	0,671	0,731	0,791	0,851	0,911	0,971	1,031
Tramo 2	0,541	0,611	0,681	0,751	0,821	0,891	0,961	1,031	1,101	1,171	1,241
Tramo 3	-	-	-	-	-	-	-	-	-	-	-
Tramo 4	-	-	-	-	-	-	-	-	-	-	-
Tramo 5	-	-	-	-	-	-	-	-	-	-	-
Tramo 6	-	-	-	-	-	-	-	-	-	-	-
Tramo 7	-	-	-	-	-	-	-	-	-	-	-
Tramo 8	-	-	-	-	-	-	-	-	-	-	-
Tramo 9	-	-	-	-	-	-	-	-	-	-	-
Tramo 10	-	-	-	-	-	-	-	-	-	-	-
Evolución del número de usuarios											
Concepto	Crecimiento										
Tramo 1	15 mm	630	637	644	651	658	665	672	679	686	693
Tramo 2	15 mm	569	575	580	586	592	598	604	610	616	623
Tramo 3	20 mm	195	195	195	195	195	195	195	195	195	195
Tramo 4	25 mm	0	0	0	0	0	0	0	0	0	0
Tramo 5	30 mm	0	0	0	0	0	0	0	0	0	0
Tramo 6	40 mm	0	0	0	0	0	0	0	0	0	0
Tramo 7	50 mm	0	0	0	0	0	0	0	0	0	0
Tramo 8	65 mm	0	0	0	0	0	0	0	0	0	0
Tramo 9	80 mm	0	0	0	0	0	0	0	0	0	0
Tramo 10	100 mm	0	0	0	0	0	0	0	0	0	0
Evolución de la cantidad demandada de agua											
Concepto	Crecimiento										
Tramo 1	141.004,00	115.320,17	95.520,38	78.878,15	65.262,97	54.034,43	44.310,30	37.353,71	31.739,58	26.934,08	22.644,70
Tramo 2	182.903,00	94.368,28	79.932,32	67.312,30	56.669,88	47.710,09	40.166,89	33.835,50	28.420,20	23.644,70	19.144,70
Tramo 3	29.201,00	20.952,49	15.957,06	11.955,86	8.953,09	6.944,49	4.742,42	3.241,21	2.140,20	1.344,70	0,00
Tramo 4	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Tramo 5	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Tramo 6	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Tramo 7	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Tramo 8	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Tramo 9	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Tramo 10	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00

IMPLEMENTATION SECTOR

This tool is useful for water management companies (suppliers), being applicable to:

- Water pricing systems.
- Decision-making support systems.
- Economic modelling.
- Prioritisation of water management investments.
- Hydroeconomic analysis.

ADDITIONAL INFORMATION

This tool is registered under the code M-006665/2015.

This intellectual property is co-owned by IMDEA Water and the University of Alcalá.

KEYWORDS

Water Tariffs Prospective, demand analysis, water pricing, decision support systems

CONTACT

imdea.agua@imdea.org



HR EXCELLENCE IN RESEARCH



Recognised by EFQM
★★★★★ 2021



Comunidad de Madrid



EUROPEAN UNION
European Regional Development Fund



EUROPEAN UNION
European Social Fund



Contact
imdea.agua@imdea.org
tel. +34 918 305 962

Avenida Punto Com, 2
28805 Alcalá de Henares
Madrid