

#### PUBLIC, SOCIAL AND COOPERATIVE ECONOMY MEETING THE GENERAL INTEREST -WATER-



#### *Pro aqua* Italian policy to get prices and governance right

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29th International Congress of CIRIEC



> The research Institute on public utilities **PROAQUA** was created in 1995 by Federgasacqua (currently Federutility) and the main public service companies. From the beginning it was shaped as a non-profit consortium, focused on technical and economic study and research activities, as well on support to all operators involved in reorganization processes of water sector.



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> In 1999 the Institute became **CRS-PROAQUA** and extended its research activities to other local public services, such as gas distribution and waste management.

> In 2006 the Institute change the name in **Utilitatis pro acqua energia ambiente**. The studies commissioned by leading Institutions provided an opportunity for consortium members to be active participants in the design of future scenarios for the sector.

>18 may 2011: consortium becames a Fondation, in which FederUtility e Federambiente are founding promoters.





## About Utilitatis' publications



> **Blue Book** which includes data about the integrated water service in Italy, and analyzes the main figures (volumes, tariffs, investments, costs) taken from the 91 Industrial Strategic Plans -which are drawn up by the respective Authorities -and by the year some accounting data of the management companies.



> **Yellow Book** which is a systematic data collection on tenders carried out in distribution service of natural gas. This data collection supported by appropriate consultation and divulgation instrument. The research analyze the accounting data of management companies.



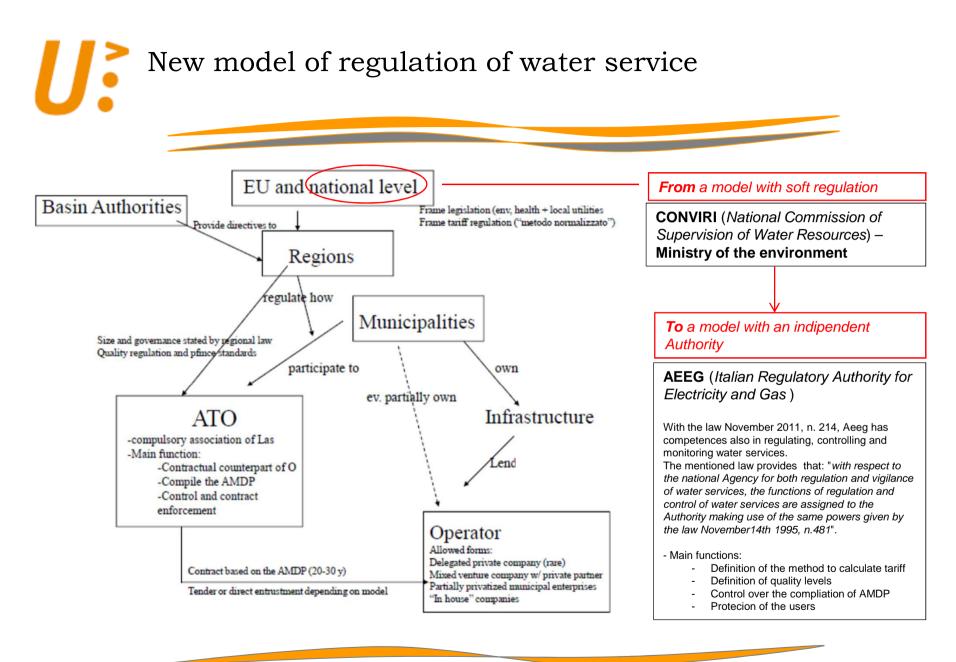
> **Green Book** studies the main economic and quantitative figures of waste industry in Italy. The last edition includes a systematic data collection on tenders carried out in waste service.





- > New model of regulation of water service
- Dimensional features of Optimal Territorial Areas
- Types of service assignment
- Economic and Financial structure of water companies
- Actual tariff computation
- Three-yearly revision process
- Investment requirements
- Families' expenditures and affordability
- > Delay
- Towards a new tariff system
- > Overview on drought







#### Dimensional features of Optimal Territorial Areas (ATO)

Population and territory of the ATOs can be very different: in some cases they are the same as the Region's, in other cases their dimensions are smaller than the Province, in some other cases they identify with a specific urban aggregate. The average ATO's population is slightly more than 600.000

Last Regional Laws are bringing to a redection of the number of the ATOs, increasing their dimension

		Population		Area	N. ATO ex	
Regione	N. ATO	Total	Average per ATO	Total	Average per ATO	Last Regional Law
Piemonte	6	4.214.677	702.446	25.402	4.234	6
Valle d'Aosta	1	119.548	119.548	3.263	3.263	n.d.
Lombardia*	12	9.032.554	752.713	23.863	1.989	13
Trentino Alto Adige	-	940.016	-	13.607	-	-
Veneto	8	4.527.694	565.962	18.399	2.300	8
Friuli Venezia Giulia	4	1.183.764	295.941	7.858	1.965	4
Liguria	4	1.571.783	392.946	5.422	1.355	4
Emilia Romagna	9	3.983.346	442.594	22.117	2.457	1
Toscana	6	3.497.806	582.968	22.994	3.832	1
Umbria**	3	825.826	275.275	8.456	2.819	4
Marche	5	1.470.581	294.116	9.694	1.939	5
Lazio	5	5.112.413	1.022.483	17.236	3.447	n.d.
Abruzzo	6	1.262.392	210.399	10.763	1.794	1
Molise	1	320.601	320.601	4.438	4.438	1
Campania	4	5.701.931	1.425.483	13.590	3.398	n.d.
Puglia	1	4.079.033	4.079.033	19.358	19.358	1
Basilicata	1	597.768	597.768	9.995	9.995	1
Calabria	5	2.011.466	402.293	15.081	3.016	1
Sicilia	9	4.968.991	552.110	25.711	2.857	9
Sardegna	1	1.631.880	1.631.880	24.090	24.090	1
ITALIA	91	56.995.744	615.997	301.336	3.162	
Max			4.020.707		24.090	
Min			119.548		1.355	



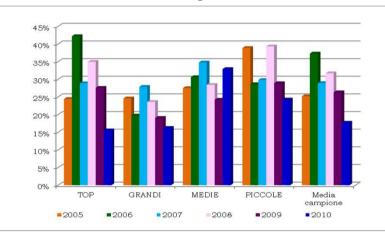
# Types of service assignment

- The situation in 2011 shows that 72 entrusting agreements have been carried out, concerning a population of about 49 millions inhabitants.
- A majority (34) of entrusted operators are public owned companies (*in house*); slighter numbers (12) occur for mixed ownership (public-private) companies, while 13 are quoted enterprises. There are only 6 concessions to third parties. In 7 cases we have other form of service assignment.
- A law requiring libaralization of water sector was introduce in 2008. Such a policy is a way to get resources into the sector given that public funds are scarce. Its implementation has been held up by regional challanges to its constitutionality (but its legality has been confirmed by the Constitutional Court) and it was finally repealed by a referendum in 2011.



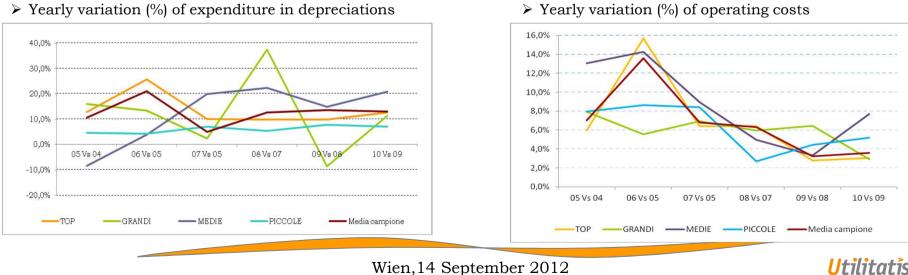


Economic and Financial structure of water companies



> Trend of investment expeditures on return

> Yearly variation (%) of expenditure in depreciations



pro acqua energia amb

## Actual tariff computation on the basis of the so called Method

> Tariff computation rule (with all variables at constant value):

$$T_n = \left(\frac{C+A+R}{VE}\right)_n$$
[1]

where

- $T_n$  is the real average tariff forecast in the area plan for the year n;
- ${\it C}$  is the total amount of operational costs;
- A is the part of depreciation;
- *R* is the return on invested capital;
- *VE* is the volume supplied in the year *n* according to the plan forecast.
- > Tariff growth constraint:

$$\frac{T_n}{T_{n-1}} \le \left(1 + K_n\right) \tag{2}$$

where  $(1+K_n)$  is the limit to price growth for year n

➢ By writing [2] through [1]:

$$\frac{(C+A+R)_n}{(C+A+R)_{n-1}} \le (1+K_n)(1+ve)$$
[3]

where ve indicates the percentage variation in the forecast of the volumes supplied in the two periods considered.

The actual constraint on the growth of the total amount of cost components included in the tariff may be relaxed in the plan through a forecast of growth in the volumes supplied.



## Operating Cost, Estimated Operating Cost and Planned Operating Cost

 Objective: reduce operating cost to promote investments

$$C_n = C_{n-1}(1 - X_n)$$

Calculation of Estimated Operating Cost

• Distribution  $COAP = 1,1 \times (VE)^{0,67} \times (L)^{0,32} \times (IT)^{0,1} \times e^{\left(0,2\frac{Utdm}{UT}\right)} + EE + AA$ 

$$IT = 100 \times \frac{\sum_{i=1}^{N} (V_i C u_i) + Vnt \times 0.01}{\sum_{i=1}^{N} V_i + Vnt}$$

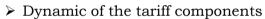
• Sewerage  $COFO = 0.15 \times (Lf)^{0.4} \times (Ab)^{0.6} + EE$ 

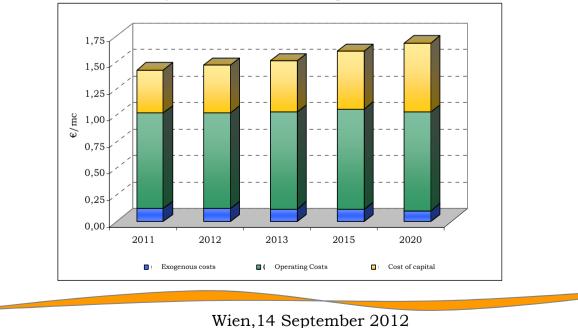
$$COTR = \sum_{i=1}^{n} \alpha_{i} (Ct)^{\beta} \times A_{i} \times F_{i}$$



## Trend of the planned tariffs (TRM - real average tariff)

<b>2012</b> 1,25 1,61 1,63	<b>2013</b> 1,30 1,66 1,69	<b>2015</b> 1,43 1,76 1,75	<b>2020</b> 1,49 1,92 1,85
1,61	1,66	1,76	1,92
-	-		
1,63	1,69	1,75	1,85
1,47	1,49	1,54	1,53
1,50	1,54	1,62	1,68
1,47	1,52	1,61	1,68
	1,50	1,50 1,54	1,50 1,54 1,62

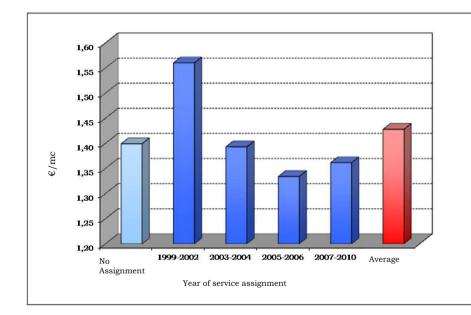




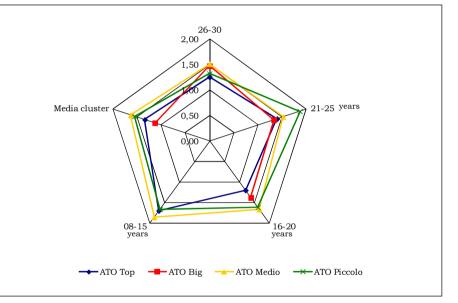


# TRM (real average tariff) for ATO - cluster analysis

> Planned tariff for year of service assignment



 Higher tariff in Optimal Territorial Areas with older service assignments  Planned tariff for dimension of Optimal Territorial Areas and duration of the planning document



 Inverse correlation between tariff levels and dimensions of the Optimal Territorial Areas

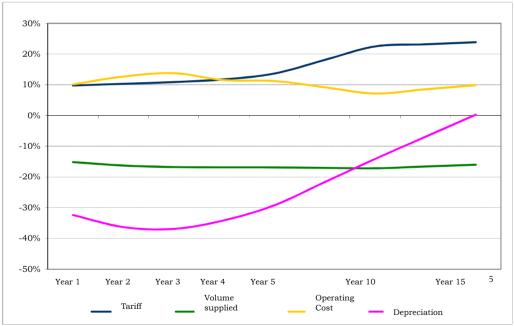




- «Three-yearly revision» is a planning instrument, more up to date in relation to the characteristics of the territory, to the changing needs of the service, to the new critical issues in the use of water resources.
- Trend of the deviations of the variables between initial plans and revisions:
  - Increase of operating costs
  - Reduction of volume supplied
  - Reduction of investments
  - In house

Volume supplied: -14% Operating costs: +2% Depreciations: -50% Return on invested capital: -40% TRM («real average tariff»): +5%

Public-private companies
 Volume supplied : -10%
 Operating costs : +14%
 Depreciations : -13%
 Return on invested capital: -20%
 TRM («real average tariff»): : +14%





# Investment requirements

Geographical	Totale 30 years	Yearly total	Public financing		
area	(mgl€)	(mgl€/year)	(mgl€)	(%)	
North - West	15.136.198	504.540	706.116	4,7%	
North - East	13.537.169	451.239	1.204.368	8,9%	
Centre	12.005.616	400.187	605.412	5,0%	
South	15.858.934	528.631	1.757.482	11,1%	
Islands	8.615.683	287.189	1.359.441	15,8%	
Italy	65.153.601	2.171.787	5.632.820	9,1%	

#### Planned investments for the next 30 years

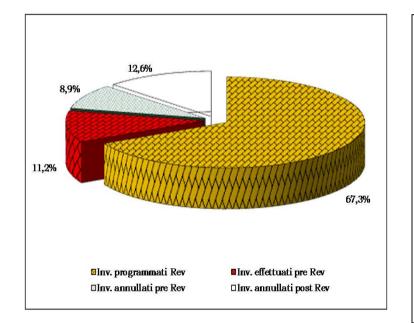
Redefinition of investments on the bases of EU objectives for 2015

Geographical area	Inv. for objectives 2015 (mgl€/year)	Yearly Total Inv. [PdA+ objectives 2015] (mgl€/ year)	Inv. next 3 years (mgl€)	Inv. next 5 years (mgl€)	<ul><li>National priorities:</li><li>Security of</li></ul>
North - West	758.021	1.262.561	3.787.682	4.796.762	supply
North - East	532.869	984.108	2.952.323	3.854.801	Suppry
Centre	557.100	957.287	2.871.861	3.672.235	<ul> <li>Treatment</li> </ul>
South	709.361	1.237.992	3.713.976	4.771.238	
Islands	338.352	625.542	1.876.625	2.451.004	<ul> <li>Sewerage</li> </ul>
Italy	2.895.702	5.067.489	15.202.466	19.546.039	

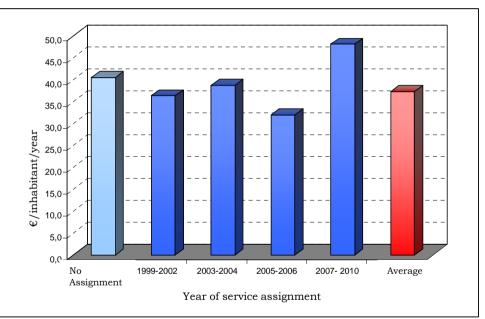


## Investments carried out and downward adjustments of investment requirements

Planned investments



Planned per capita yearly investments for year of service assignment



• Lower investments in Optimal Territorial Areas with older service assignments; this is due to the downward correction of the investments originally planned



## Families' consumptions and expenditures

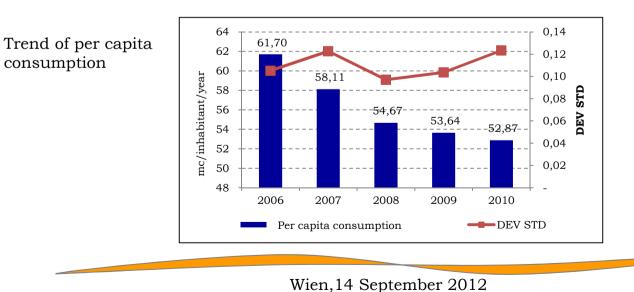
- $\succ$  Estimate of average yearly expenditure of a hypothetical family, with different volumes of water consumption, is carried out considering the tariffs of 50 water basins (29 millions oh inhabitants)
- ➢ Expenditure variation 2011/2010 (consumption of 150 mc): +4,3%

consumption

 $\geq$ 

Average expenditure for drinking water consumption  $\geq$ 

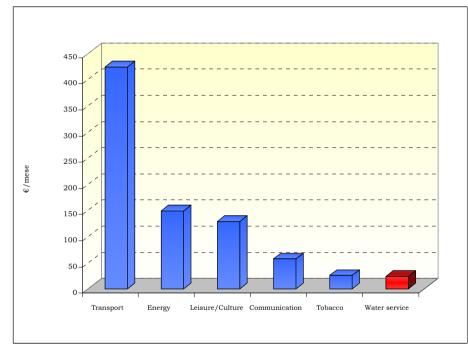
	100 m	C	150 mc		
Geographical area	Expenditure 2011 (€/year)	Unit price (€/mc)	Expenditure 2011 (€/year)	Unit price (€/mc)	
North - West	121,31	1,21	185,34	1,24	
North - East	153,84	1,54	237,94	1,59	
Centre	147,87	1,48	229,95	1,53	
South	126,14	1,26	201,67	1,34	
Islands	137,29	1,37	216,63	1,44	
Italy	136,23	1,36	212,89	1,42	



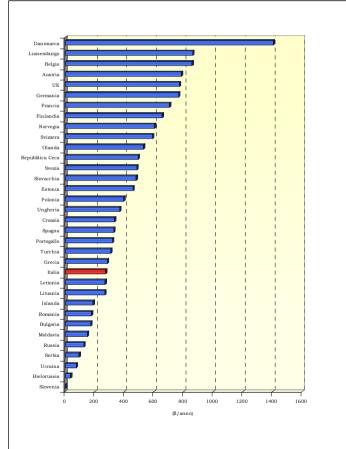




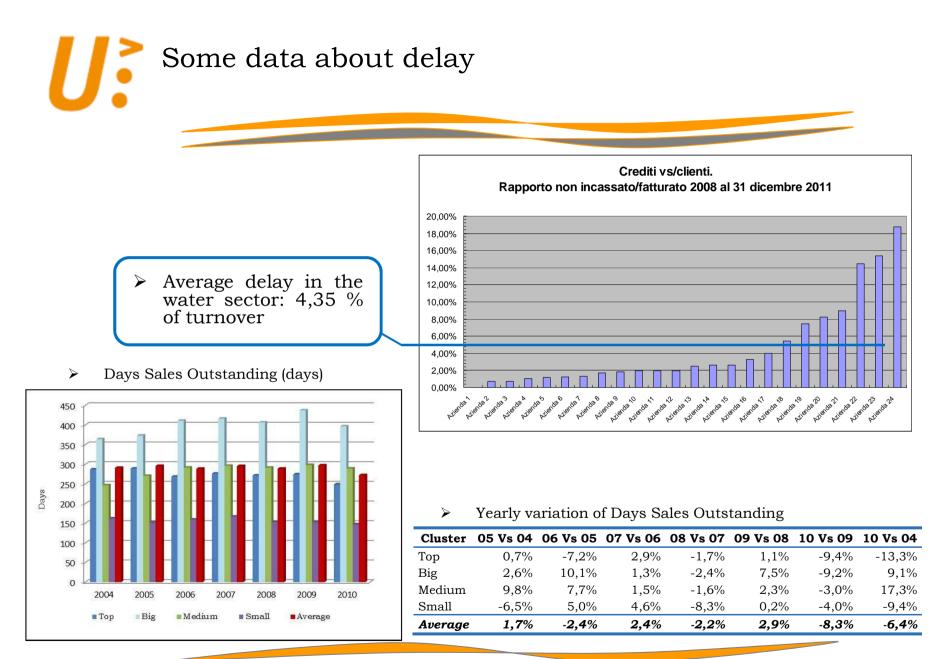
Monthly expenditure of a family made up of 3 components for some goods and services (year 2010)



Water price are on average quite low compared with other European countries. OECD, in its Economic Survey on Italy (2011), wrote: «water has been underpriced for a long time and both price controls and the organisational structure have prevented a rational use of resources».









## > Towards a new tariff system: from ex ante "kregulation" to ex post "ϑ regulation»

- > Tariff Method for the years 2012-2013
  - Fees applied in 2012 (calculated on the base of the old Method) and held constant in 2013 have to be updated multiplying them by a factor  $\vartheta_i^t$

$$\vartheta_i^t = \frac{VRG_i^t - ARIC_i^{2011}}{\sum_u \underline{tarif_{u,i}^{2012}} \bullet \left(\underline{vscal_{u,i}^{2011}}\right)^T}$$

where

 $VRG_i^t$  is the constraint to revenues for the enterprise *i* in the year *t* 

 $ARIC_i^{2011}$  are non tariff revenues

 $\sum_{u} \underbrace{tarif_{u,i}^{2012}}_{u} \bullet \left( \underbrace{vscal_{u,i}^{2011}}_{u,i} \right)^{T}$  is the admitted revenue, calculated on the base of scale variables of the year 2011

• Variance (*Rp*<sub>i</sub>) between the tariffs actually applied and those which have applied with new methodology . This variance will be offset in 2014.

$$Rp_{i}^{2012} = \vartheta_{i}^{2012} \sum_{u} \underline{tarif_{u,i}^{2012}} \bullet \left(\underline{vscal_{u,i}^{2011}}\right)^{T} - \sum_{u} \underline{tarif_{u,i}^{2012}} \bullet \left(\underline{vscal_{u,i}^{2012}}\right)^{T}$$

Actually, the calculation of tariffs applied to the user is mainly driven by predictive variables, which can have significant deviations from those found in final balances.

The new tariff system do not considers any planned variable and refers only to the variables recorded in an annuity: this could lead to not adequately consider some significant elements





- Some definitions
  - Meteorological drought:

"A period of abnormally dry weather sufficiently prolonged for the lack of precipitation to cause a serious hydrologic imbalance in the affected area". (Huschke, R.E., ed. 1959)

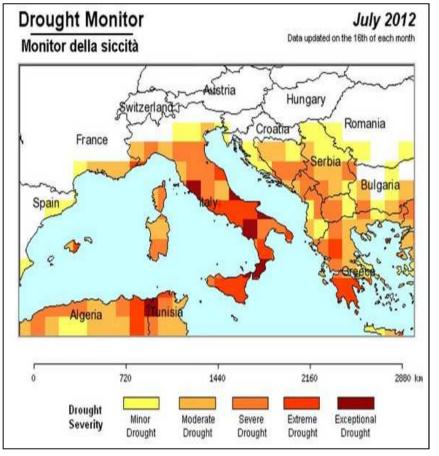
Hydrologic drought:

"A period of below average water content in streams, reservoirs, ground-water acquifers, lakes and soils". (Yevjevich Vujica, Hall, W.A., and Salas, J.D., eds.,1977)

• Agricultural drought:

"A climatic excursion involving a shortage of precipitation sufficient to adversely affect crop production or range production". (Rosenberg, N.J., ed., 1979)

- Some action strategies
  - to adapt technologies used (e.g. plants cooling to recycling rather than continuous-flow)
  - to replace the water demanding activities with other non-water demanding
  - to use systems to cover the risk of drought, such as insurance schemes to compensate for the nondelivery.







### **Fondazione UTILITATIS** pro acqua energia ambiente

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