Water Pricing in Italy
Beyond Full-Cost Recovery

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Water Pricing for a Dry Future
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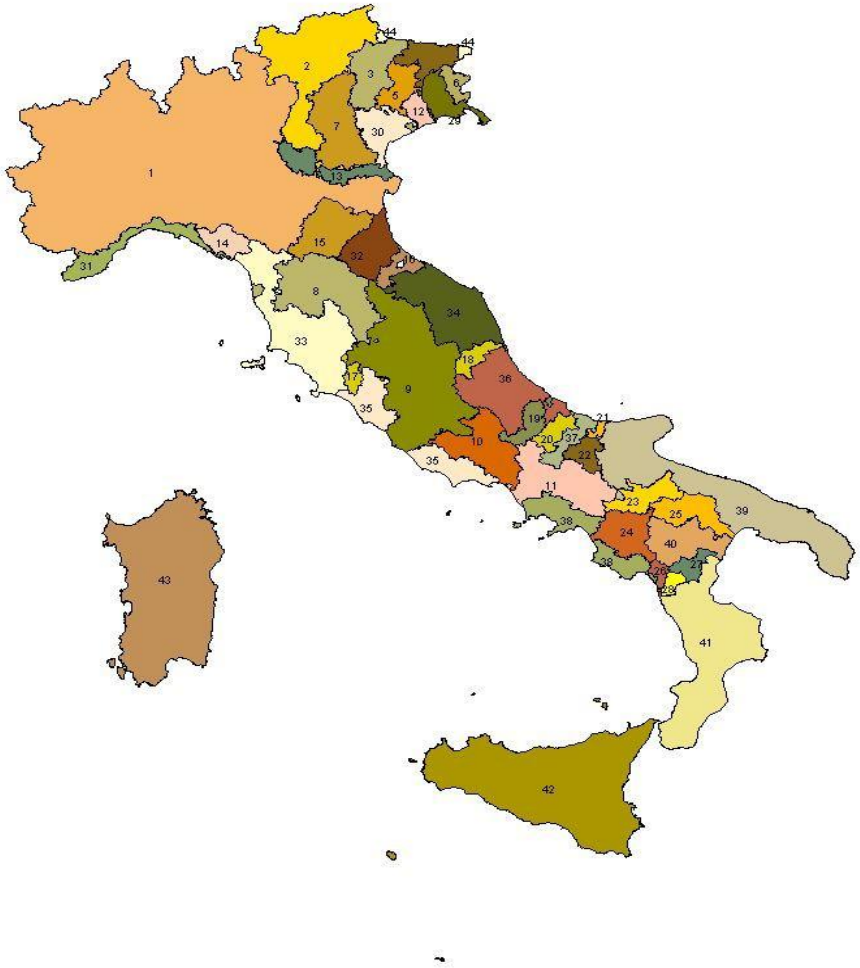
BACKGROUND

Regions and River basins in Italy



The Water Districts (Dlgs 152/2006)

RBD aimed at achieving a more coherent and consistent governance
Legacy however is dominated by fragmentation and piecemeal policy system

Water planning hierarchy

District Basin Plan

- Information base for the whole planning process
- Identification of the “macro” constraints and trends
- Definition of criteria for water rights allocation
- Identification of policy issues, priorities and strategic goals

Hydrogeological plan

-Identification of risk situations
-Programming of flood protection works
-Provides binding directives to regional development plans

Water resources management plan

-Identifies actions aimed at achieving strategic targets
-Identifies milestones and specific targets
-Allocates tasks and responsibilities among Regions
- Coordinates Regional water resources plans

Region 1

-Water resources plans
-Water protection plans
- Regional development plans
- Sectoral plans

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Water rights system

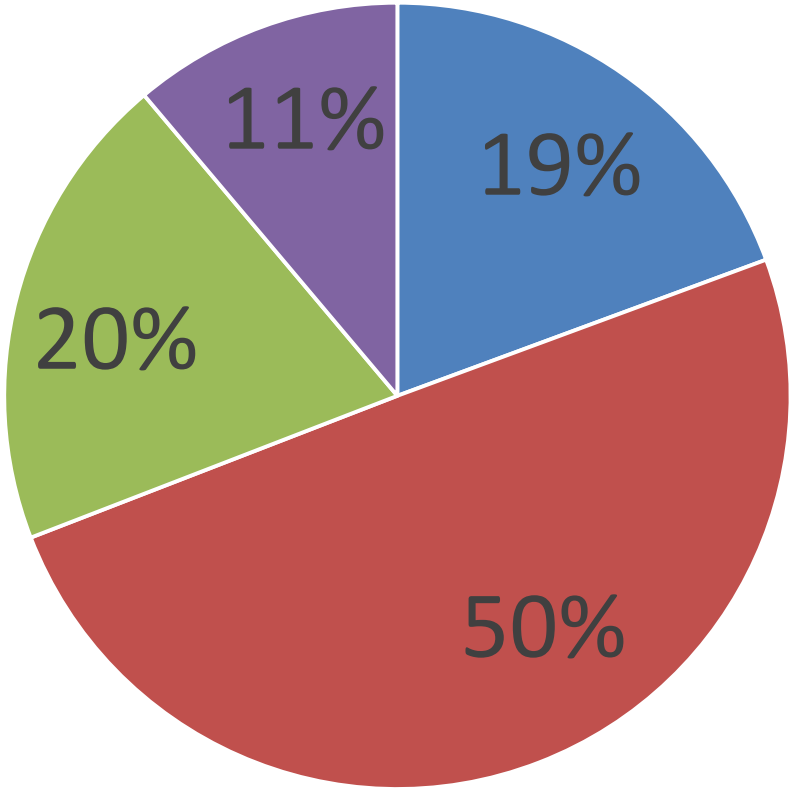
- All waters belong to the public domain
  - Surface waters since 1933
  - Groundwater since 1994
  - Right to discharge since 1976
- Water use requires a license
  - Licenses are released for a limited period (70 yrs)
  - An abstraction fee is levied on licenced uses
  - License implies right to use, but not to trade
  - Are subject to regulations and prescriptions of required behavior
  - May be withdrawn (compensation required in some cases) or made subject to restrictions (e.g. minimum flow requirements) in order to achieve river quality targets
  - In case natural resource does not suffice, emergency plans are issued on an authoritative basis

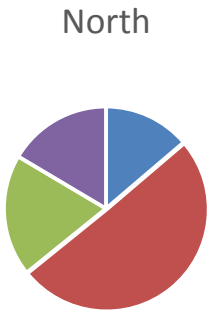
WATER MANAGEMENT

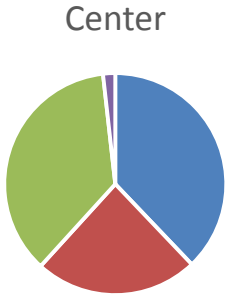
Some key facts

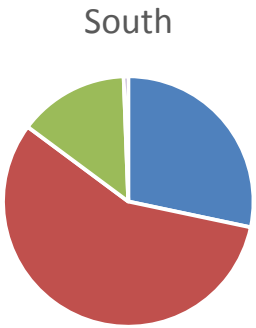
- Water-rich on average
  - Mountaineous country
  - Alpine chain delivers regular summer flows compensating mediterranean climate
  - Yearly variability very high (± 40%) ⇔ «the rich cry too»
- Very intensive use, especially in the North
  - Encouraged by favourable natural conditions
  - Irrigation is the dominant use (around 50%), established since the Middle Age
  - Management system relatively simple and local; low-tech, low-cost, low productivity ⇔ extensive patterns of use

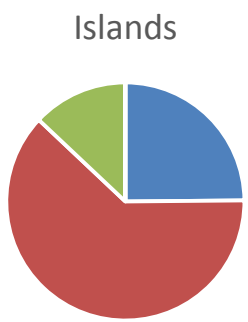
Water abstractions in Italy











PWS
Irrigation
Industry
Hydropower

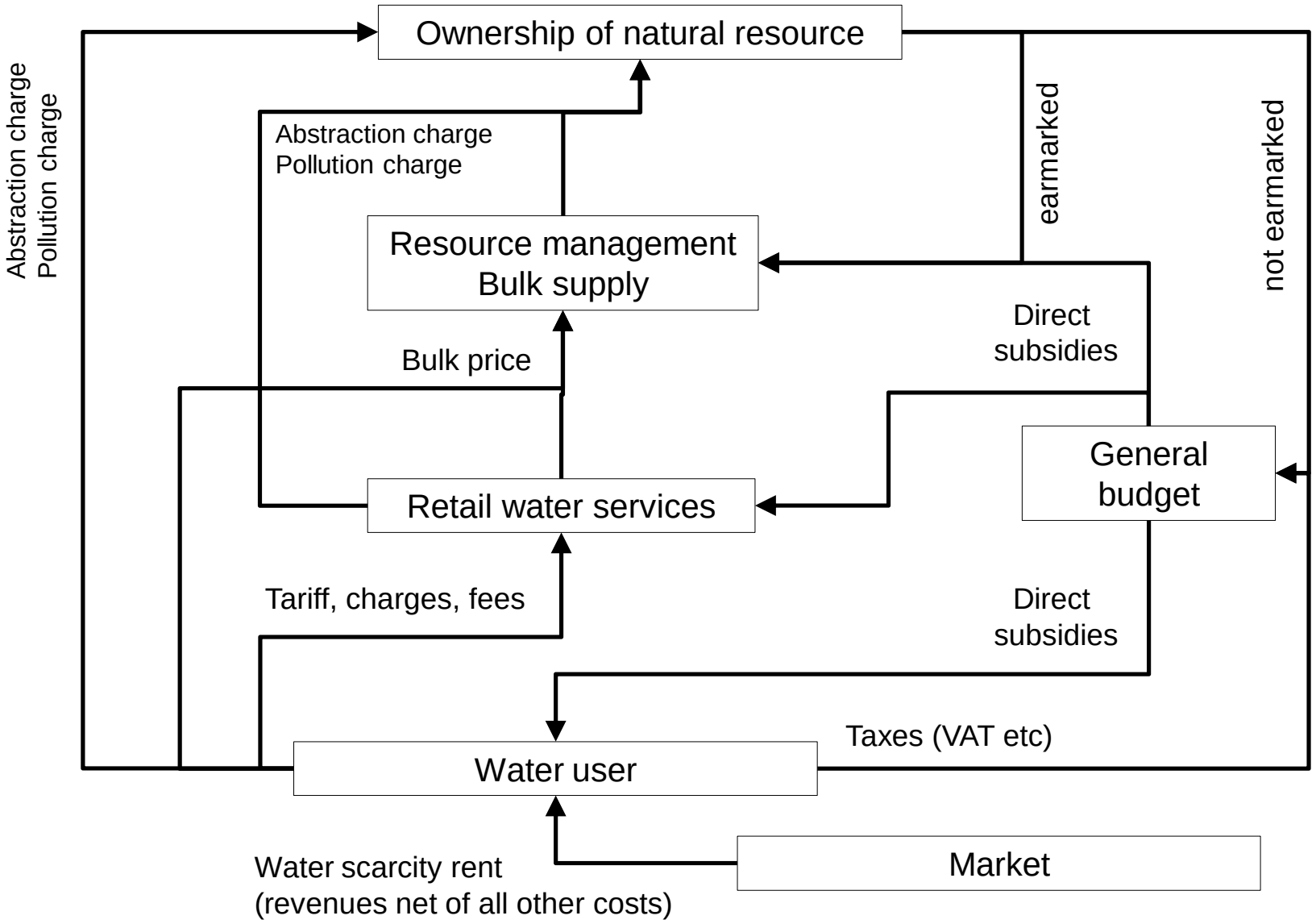
Water management systems at a glance

	Bulk systems Resources management	Collective systems	Self supply
Public water supply	Entities managing multi-purpose reservoirs and bulk supply schemes Entities managing wholesale aqueducts	Integrated water service operator	Residual in scattered settlements
Wastewater collection		Integrated water service operator	Residual in scattered settlements and rural areas
Wastewater treatment		Integrated water service operator	Residual in scattered settlements and rural areas
Irrigation	Entities managing multi-purpose reservoirs and bulk supply schemes	Collective landowners' associations	Private wells Small rainwater harvesting
Drainage of private property	Collective landowners' associations	Collective landowners' associations	
		Integrated water service operator	
Drainage of public land		Integrated water service operator	
Industrial water supply	Entities managing multi-purpose reservoirs and bulk supply schemes	Integrated water service operator Industry-dedicated systems	Private wells
Industrial sanitation	Collective landowners' associations	Integrated water service operator Industry-dedicated systems	Individual treatment at industrial premises

Water management systems at a glance

	Collective	Self-supply
PWS&S	115 untertakings serving 70% of resident population Further 1.500-2.000 small undertakings Trend: further concentration (70 undertakings for 100% of population)	Residual (rural-dispersed population)
Irrigation	136 consortia service > 90% of irrigated land and supply approx. 70-80% of total water (depending on years)	Complementary (areas served by collective systems) Dominant where no collective systems are in place
Industry	Connected to PWS for sanitary and process uses (when not water-intensive) Some cases of industrial aqueducts in industrial districts; more frequent for wastewater	Dominant for large water-intensive industries (e.g. food, paper) Dominant for cooling (mostly seawater)
HP		Private/Privatized 100%

Financial flows



Abstraction charges

	HP	PWS	Hygienic	Fish farming	Industrial	Irrigation		
						No restitution	With restitution	Unmetered
	€/kW	€/mod	€/mod	€/mod	€/mod	€/mod	€/mod	€/ha
average	13.4	1,664	2,824	264.2	9,646	35	8	0.33
median	14.5	2,110	603		13,474	46	-	0.40
max	35.1	4,008	98,816		41,361	190	50	2.64

Module = 100 l/sec
Means less than 1 €c per m3

Abstraction charges

- A missed opportunity so far
  - Long neglected; now again discovered but in a piecemeal and non coordinated way
  - Negligible magnitude (exception for HP and industrial uses); aimed at scarcity rent sharing
  - An order of magnitude lower than public spending in the water sector (some hundred million €/yr)
- Options
  - Significantly increase in order to incorporate ERC
  - Modulate in order to include incentive design
  - Earmark to water policy budget

Water pricing in the past

- Legacy from the past
  - Hardly opex recovered
  - Investments funded by taxpayers
- Drivers of change
  - Fiscal crisis and distress of public finance
  - Prolonged underinvestment
  - Need to start new investment cycle
  - UPP/PPP provides legitimacy, but is not the prime motivation

Water pricing reform in PWS&S

- Aims
  - Achieve financial self-sufficiency
  - Territorial solidarity
  - Industrial operation
  - Efficiency improvement
- Means
  - Full-cost recovery + some residual gvmt subsidies
  - Centralized regulation
  - Cost-based + benchmarking for opex
  - Regulation primarily concerned with total revenue and not on individual rates
  - Two subsequent regulatory approaches (MTN 1996-2011; MTI 2012-present)

Water pricing today

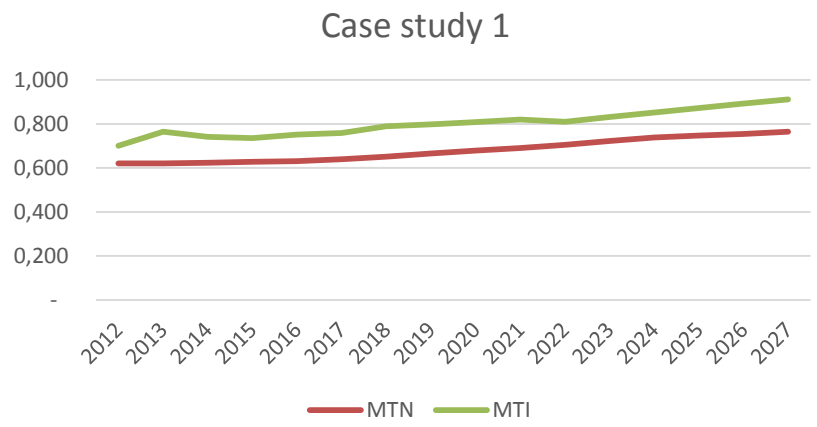
	Tariff structure	Incentive	Recovery of OPEX	Recovery of CAPEX
PWS & Sanitation	IBT	***	Full	New: 84% Total asset: 30-50%
Irrigation	Flat (ev. Differentiated acc. to crop, service level)	*	Full	0-5%
	Volumetric (minority of cases)	**		
Industrial	Volumetric	**	Full	New: high Total asset: low

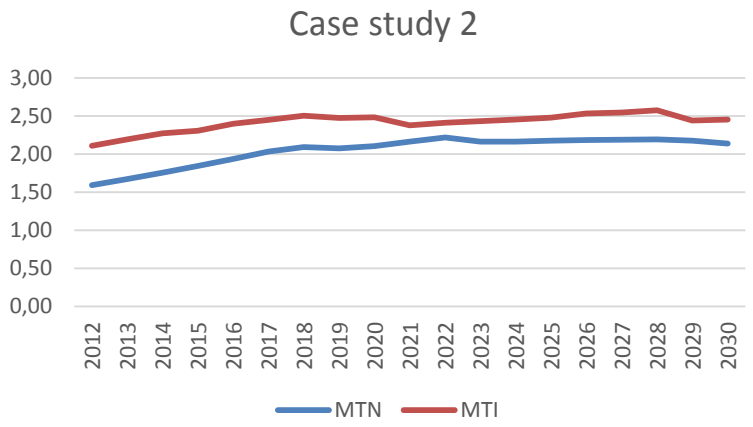
	Normalized tariff method (MTN)	Transitional tariff method (MTT)	Definitive regulation (MTI)
Period	1996 - 2011	2012-2013	> 2014
Operational costs (Opex)	Estimated through a desktop study Revision admitted but not regulated in detail	Based on 2011 accounts and Opex admitted by previous regulation Opex converge to 2011 accounts or Opex admitted by previous regulation depending on specific circumstances	Opex = average between 2011 accounts and Opex admitted by previous regulation Possibility to define a new OP in case of structural change in service
Efficiency gains	Price-cap based on benchmarking formula	No incentives in the transition period Announced for the future	No incentives in the I period Announced for II period
Pass-through costs	Electricity, Bulk water, local charges and taxes	As for MTN	As for MTN Electricity cost is passed through, within the limit of average market price * actual consumption
Asset base	Assets already owned by operators at book value New investment made by operator at historical cost, anticipated according to the contract (compensation ex post on a triennial basis)	Assets already owned at reconstruction cost New investment at reconstruction cost (only actually realized investments after a time lag of 2 years) Assets owned by municipalities at reconstruction cost (cash flow set aside to the FoNI)	As for MTT Additional provision (anticipation for new investments) foreseen in case RAB < than a certain fraction of investment needs
Grants received	Not included	Included (depreciation only). Set aside to the FoNI	As for MTT
Depreciation	Any schedule admitted by tax legislation	True economic life	As for MTT
Financial amortization	Allowed	Not allowed	Allowed in case the RAB < 50% of investment needs
Rate of return	Lump-sum rate (7%) on all investments sourced by the operator (on historical cost basis)	Market-based rate on all investments sourced by the operator (on revalued historical cost) Same rate applied to assets owned by municipalities (revenues set aside to the FoNI) Further lump-sum (1%) for new investments to compensate the time lag	As for MTT

The devil hides in the details!

- Different ways to intend FCR …
  - Accounting systems matter (especially for capex)
  - Benchmarking / standard cost vs. actual cost
  - Perimeter of eligibile costs matters (e.g. provisions)
- Lead to dramatically different oucomes
  - Tariff dynamics: even 2 times higher!
  - financial sustainability profiles: indicators vary significantly

Two case studies





Typical IBT structures

- Typical features
  - Includes a fixed charge, a subsidized block (for residents only), a baseline block and 3 superior blocks
  - Differentiated schedules according to use (domestic, second houses, commercial, industrial, agricultural etc)
- Controversial effects of IBT on water demand
  - Very little or not effective at all until tariffs were very low
  - Evidence of reduced consumption in the last decade (might be related to tariff increase, although not necessarily and solely to that; further investigation is needed)
  - Low elasticity at the margin; possibly higher one-shot effect due to dramatic price increase occured

Tariff dynamics

- Impressive dynamics
  - More than doubled in 15 years in real term
  - Further 50-100% increase expected
- However:
  - Starting level very low (one of the lowest in OECD)
  - Still remains low compared to other EU countries
  - Quantity matters! Higher per- capita consumption ⇔ lower rates per m3

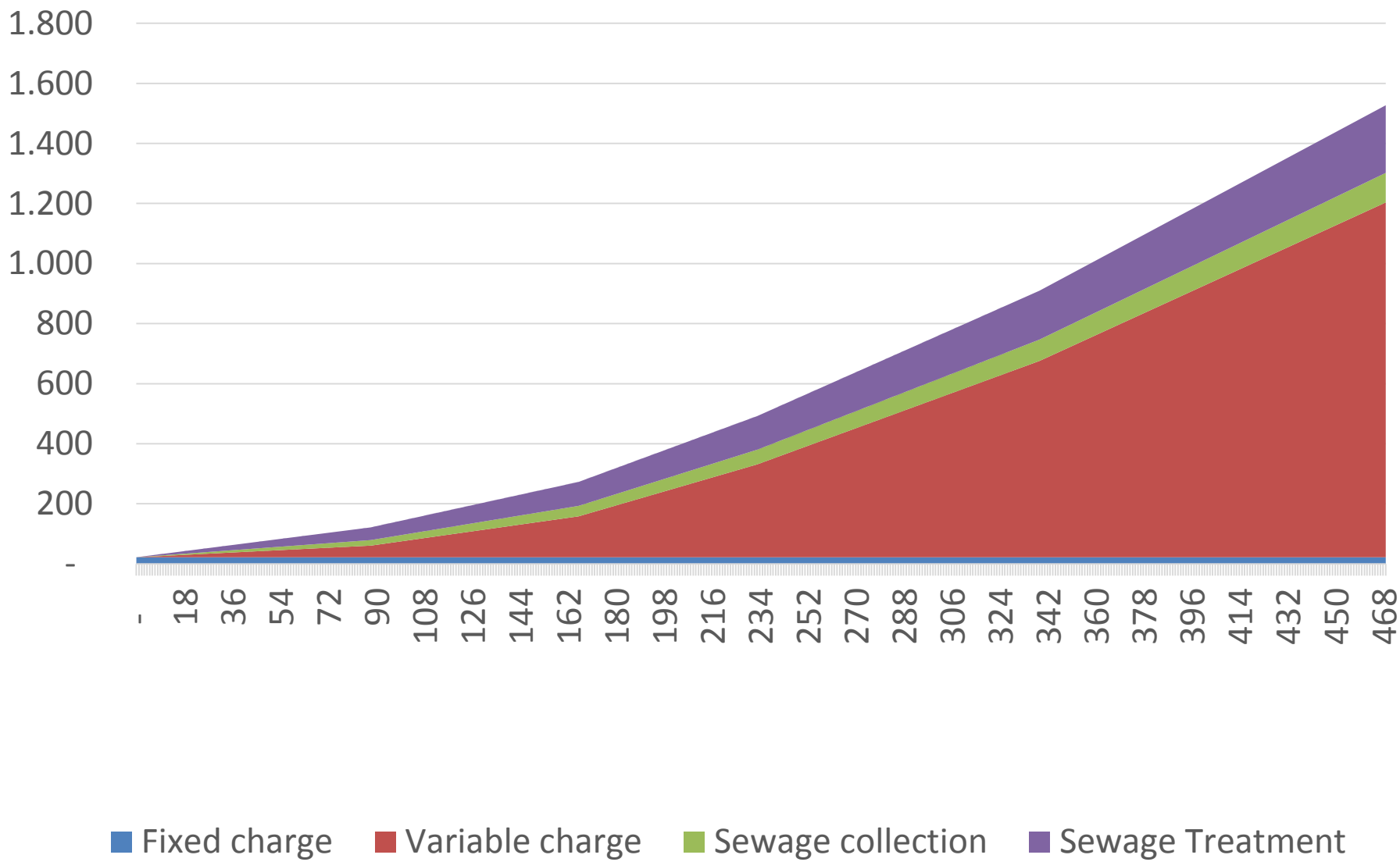
Average family expenditure

	% residential	Per-capita consumption		Annual expenditure		Average expenditure	
		m^3/yr	l/day	€/yr		€/m^3	
				60 m^3	150 m^3	60 m^3	150 m^3
North West	72	75	205	85	208	1.41	1.39
North East	69	59	162	101	256	1.68	1.71
Center	71	57	156	111	262	1.84	1.75
South	79	49	134	103	247	1.71	1.65
Islands	77	52	142	103	253	1,72	1.68
Italy	74	60	164	99	242	1.65	1.61

Average tariff structure - 2013

	Fixed	Subsidized		Base		I block		II block		III block	Sewage collection	Sewage treatment
	€	€/m3	Up to (m3)	€/m3	Up to (m3)	€/m3	Up to (m3)	€/m3	Up to (m3)	€/m3		
Average	22	0,44	88	0,81	166	1,33	233	2,00	339	2,81	0,21	0,48
Max	31	1,12	131	1,49	274	2,89	390	4,08	520	5,15	0,66	0,70
Min	15	-	20	0,24	48	0,41	96	0,84	144	1,14	0,09	0,13
n. ATO		41		40		40		33		15,00	39,00	39,00
Pop (ml)		28		28		28		24		15,60	26,90	26,90

The average tariff structure (€/year)



Affordability issues

	% of IWS on average annual expenditure on total consumption	Incidence of IWS expenditure on the average income poverty line (%)
60 m3	0.47	1. 39
150 m3	0.72	1.53

Affordability still not an issue, but may become so in the future ⇔ future tariff increase expected in the reach of 100-200% depending on local circumstances

Some inter-regional equalization needed ? (under consideration)

Recent literature suggests that utility subsidies are a very inefficient way to protect the poor; Targeted subsidies to be preferred

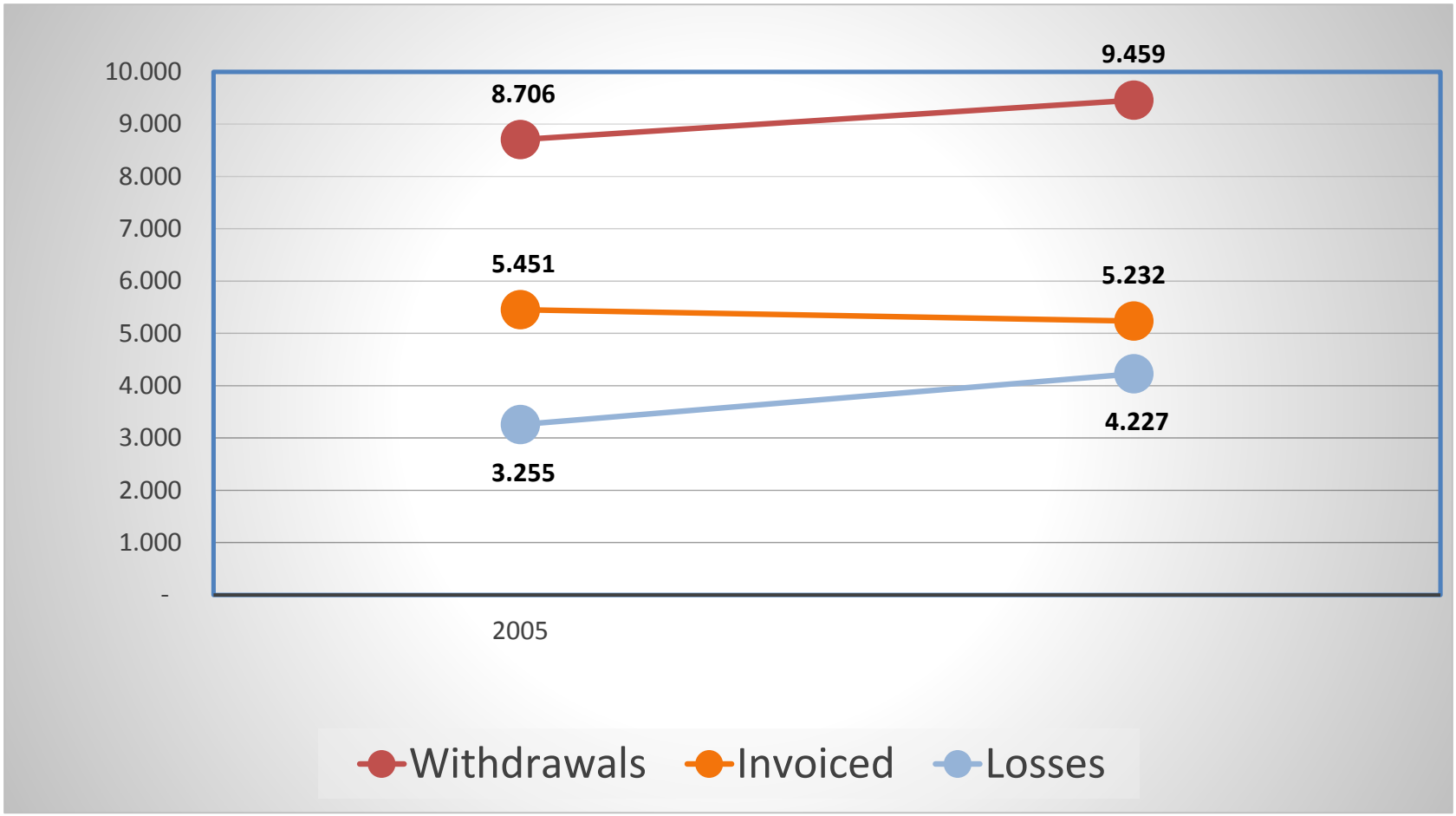
Irrigation pricing at a glance

	North-West	North-East	Center	South	Islands	Italy
Irrigation technology						
Submersion	80%	40%	17%	14%	12%	48%
Sprinklers	19%	49%	71%	42%	64%	38%
Drip	1%	12%	12%	44%	23%	14%
Water distribution technology						
Gravity	91%	64%	60%	63%	45%	76%
Pumped	9%	36%	40%	37%	55%	24%
Availability						
on demand	26%	65%	96%	48%	60%	51%
by turns	74%	35%	4%	52%	40%	49%
Charging method						
Surface	39%	49%	37%	50%	41%	45%
Volumetric (binomial)	39%	49%	37%	50%	41%	45%
Mixed	21%	3%	27%	0%	19%	10%
Charges per ha (surface only)						
average	123	78	140	169	220	127
min	35	17	55	45	170	17
max	304	220	400	500	270	500
Charges per m3 (binomial)						
Average Fixed charge per ha	82	67	36	44	178	68
Average charge per m3	0,12	0,24	0,14	0,20	1,57	0,31
Min charge per m3	0,00	0,02	0,01	0,01	1,56	0,00
Max charge per m3	0,24	0,86	0,33	0,40	1,57	1,57

To sum up

- Italian water pricing dominated by financial (rather than micro-economic) considerations
- Incentive design in the PWS&S, but not explicitly targeted at water conservation
- Incorporation of ERC in water tariffs adopted formally, but not effectively
- Policy priority to achieve financial equilibrium and cost recovery ⇔ Provide signals to OPERATORS vs. FINAL USERS
- Water scarcity more a concern for irrigation and HP w/ possible conflicts vs ENV; not too much for PWS

Withdrawals, delivery and losses: 2005-2012



Water demand declines, but water abstractions increase ⇔ leakage!!
Leakage rate is highest in the areas that are facing higher resource constraint!

A case study about 2003 drought

- Damage observed
  - Very high (1,4 billion€)
  - Adaptation measures helped a lot (could have been 2 times higher)
  - Could have been up to 7 times lower if structural improvements were available (eg reallocation of irrigation water to high value crops)
  - Not worth doing if frequency < 5 yrs
- Distribution matters!
  - Costs shifted on prices, consumers are nets losers
  - Agricultural sector as a whole gained even if some farmers lost

Why such a limited use of pricing signals?

- Policy priorities:
  - Invest in sanitation and rehabilitation of supply networks
  - restore financial sustainability of WSS operation and have access to capital markets
  - Fierce resistance against “commoditisation”
- Transactions costs very high
  - Domestic uses rarely have individual metering
  - in agriculture TC enhanced by structural factors
  - Need to prevent self-supply and encourage connection to collective systems
  - In order to be effective tool of demand mgmt., requires structural transformation (eg pressurized distribution): worth doing?
- Allocation patterns can be improved without too sophisticated practices (priorities very clear)
  - Reliance on administrative decision for macro allocation, possibly improved via participated decision and compensation / PES
  - Other mbi possibly more useful (eg insurance)