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Autorità di Regolazione per Energia Reti e Ambiente

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REPORT ON WATER SERVICES & WASTE MANAGEMENT

Lorenzo Bardelli
Head of ARERA Environment Department

AGENDA

1. Water
2. Waste management
3. Hopes, Forecasts and Reasonable Expectations

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WATER

Integrated water service: Complexity of multi-level governance

National level

*Minister of environment and energy security [**MASE**]: set general principles and rules concerning all water resources uses (including SII)*

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Sovra-regional/ District level

*7 **District Authorities**: set District Management Plan (in compliance with WFD 2000/60/CE), including "…the contribution made by the various water uses to the recovery of the costs of water services … " , " … having regard to the economic analysis … " and "… in accordance in particular with the polluter pays principle" (art.9, par. 1 & 2)*

Regional level

***Regions** define the boundaries into which water service is organized (Ambiti Territoriali Ottimali, ATO) and set the competent Authority for each ATO (Ente di governo dell'Ambito, EGA)*

Local level

***62 EGA**: legal entity in charge of public functions of planning and tariff proposal for a specific territory (i.e. Ambito Territoriale Ottimale, ATO)*

*About 2.000 **operators** (but over 80% of population is served by about a hundred of medium-large operators)*

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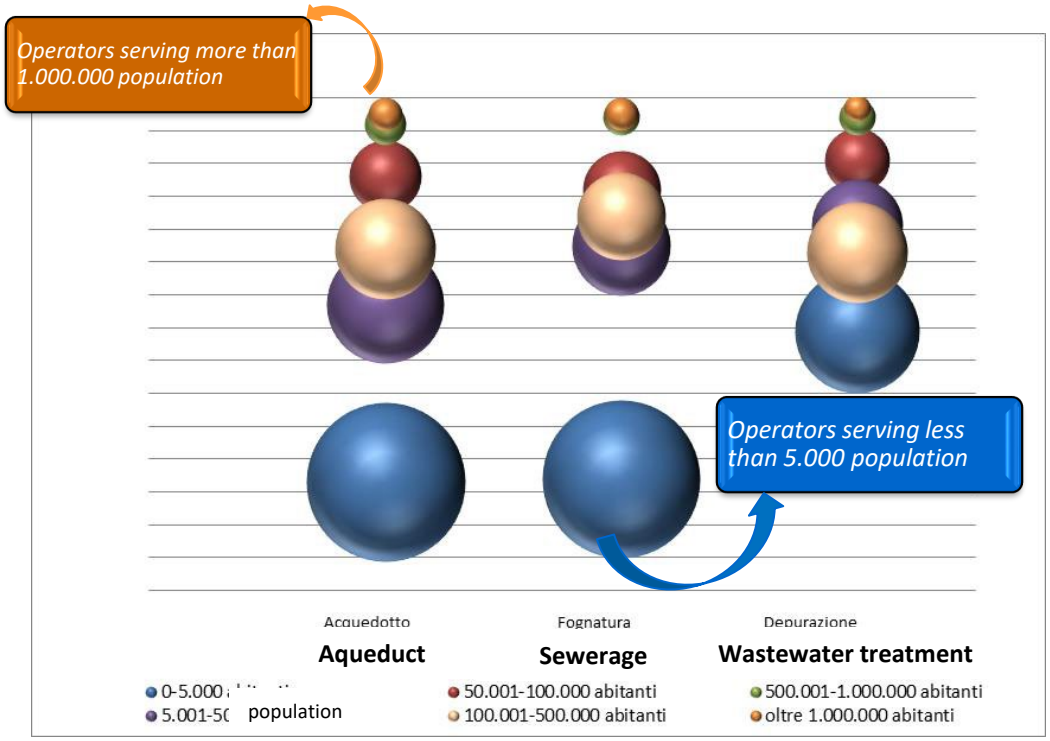
Water service operators

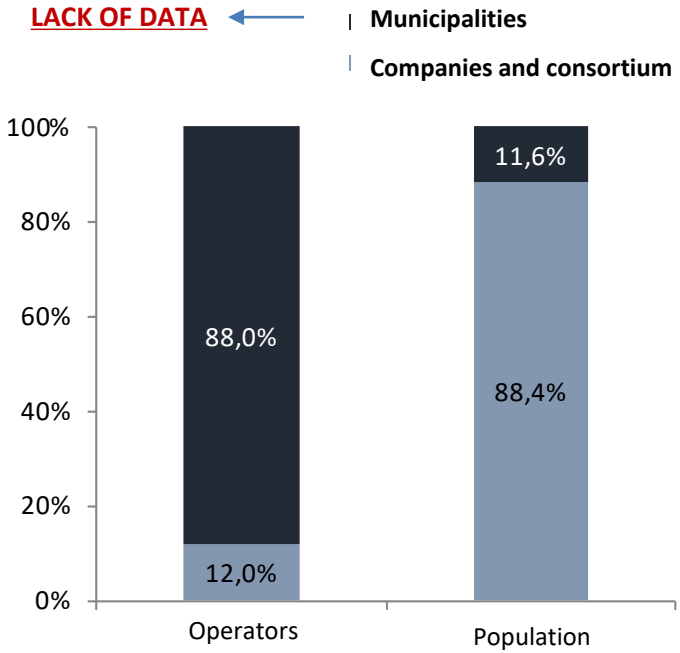
- Rationalization of the operators number:
  from 2.600 operators in 2014… **to around 2.000** operators

➢ Operators heterogeneity, small size



The balls volume shows the number of operators in each class of population

➢ Among the (nearly) 2.000 operators, more than 1.700 are Municipalities offering directly the services at 11,6% of the Italian population



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Quality objectives: Regulation of technical quality - RQTI

- graduality
- since 1 January 2018

- **output based** (vs user or environment)
- **technology neutral**

INDICATORS

Prerequisites

- identifying broad criticalities to overcome:
  - **data availability and reliability** (in general and on water consumption, in particular)
  - minimum conditions required by existing legislation:
    - **drinking water quality** (Dir. 98/83/CE)
    - **environmental impact** (Dir. 91/271/CEE)

Specific standards

- conditions required by existing legislation on security of water supply (service interruptions)
- **automatic reimbursement** to users in case of not respecting standards
  - 30-60-90 Euro/failure/user
  - 2 times/year
  - also indirect users

ID	Indicator	Specific *standard*
S1	Maximum duration of each planned interruption	24 hours
S2	Maximum time before activating a substitute emergency service in case of interruption	48 hours
S3	Minimum time notice for planned intervention implying a service interruption	48 hours

General standards

- 6 **macro-indicators** whose targets are differentiated according to the operator's state of efficiency (class of indicator)
- other indicators linked to macro in order to better describe technical condition of integrated water service
- **award/penalty** incentive mechanism

Water conservation

- M1 - WATER LOSSES
- M2 – CONTINUITY OF SUPPLY
- M3 – WATER QUALITY

Environment protection

- M4 – SEWERAGE SYSTEM ADEQUACY
- M5 – SLUDGE DISPOSAL IN LANDFILL
- M6 – TREATED WASTEWATER QUALITY

RQTI - Decision 917/2017

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Tariff methodology: regulatory scheme

ARERA adopted a comprehensive definition of tariff proposal, named “specific regulatory scheme”, to be adopted by EGA, with the involvement of service supplier, and to be detailed for a four-year regulatory period. The “specific regulatory scheme” includes:

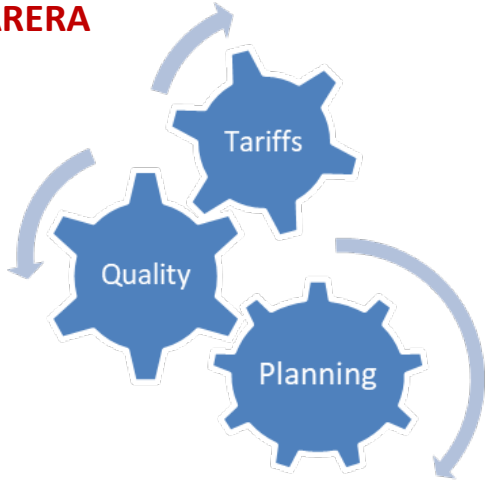
INFRASTRUCTURE AND MANAGEMENT PLAN (IMP)

FINANCIAL AND ECONOMIC PLAN (FEP)

ENTRUSTMENT CONTRACT (EC)

- disentangling all the **relevant measures** to be implemented in order to achieve the predefined **quality objectives**
- specifying revenues, average **tariff** for end-users and all the **costs** to be reimbursed to the supplier
- clarifying liabilities of EGA and service supplier **according to the standard framework defined by ARERA**

Evidence-based information, both on **accounting data** and on **technical and contractual parameters**, are combined with the **objectives** to be achieved and with the corresponding envisaged **measures**, in a framework in which the roles and **liabilities of the parties** are clarified.



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Infrastructure measures: Instruments for Planning

Since 2020:

STRATEGIC INVESTMENTS PLAN (SIP)

- includes strategic infrastructures to realize:
  - which realization requires necessarily more than 1 year, also due to their technical complexity
  - considered a priority by the Local Authority
- time period 2020-2027
- admitted infrastructures:
  - for every service (aqueduct, sewerage and wastewater treatment)
  - useful life not less than 20 years

Since the 1st tariff method:

INFRASTRUCTURE & MANAGEMENT PLAN (IMP)

includes:

- Criticalities of the territory
- Targets to reach, in order to solve critical issues
- Infrastructures to realise during the regulatory period to reach targets

the time schedule specifies elements of coherency with River basins planning and foreseen public contributions

by 2027, should foresee a rate of renovation coherent with the asset useful life and have to specify convergence measures

particular relevance of work in progress

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Tariffs: definition of a specific regulatory scheme [period 2020-2023]

The matrix of regulatory schemes identifies the operator position to properly define:

- **COST REIMBURSEMENT RULES**
- **PRICE LIMITS**

AVERAGE REGULATED REVENUES PER CAPITA (149 € per capita)

INCENTIVES TO RATIONALIZATION OF THE OPERATORS NUMBER

More activities

More investments

	$\frac{VRG^{2018}}{pop + 0,25\, pop_{flut}} \leq VRG_{PM}$	$\frac{VRG^{2018}}{pop + 0,25\, pop_{flut}} > VRG_{PM}$	AGGREGATIONS OR SIGNIFICANT CHANGE IN TECHNICAL PROCESSES
$\frac{\sum_{2020}^{2023}(IP_a^{exp}+CFP_a^{exp})}{RAB_{MTI-2}} \leq \omega$	**SCHEME I** Ordinary rules Price limit: 5,2%	**SCHEME II** Ordinary rules for Capex Price limit: 3,7%	**SCHEME III** Ordinary rules for Capex Additional Opex component Op^{new} Price limit: 6%
$\frac{\sum_{2020}^{2023}(IP_a^{exp}+CFP_a^{exp})}{RAB_{MTI-2}} > \omega$	**SCHEME IV** Additional Capex component FNI and accelerated depreciation Price limit: 7,7%	**SCHEME V** Additional Capex component FNI and accelerated depreciation Price limit: 6,2%	**SCHEME VI** Additional Capex component FNI and accelerated depreciation + Additional Opex component Op^{new} Price limit: 8,5%

0,5

INCLUDING PLANNED INVESTMENTS COVERED WITH PUBLIC FUNDS

MTI-3 – Decision 580/2019

Cost components and tariff multiplier

Tariff multiplier

$$\vartheta^a = \frac{VRG^a}{\sum_u \underline{tarif}_u^{2019} \bullet (\underline{vscal}_u^{a-2})^T + R_b^{a-2}}$$

to apply to fix and variable end user tariff components adopted by each operator in the base year 2019

REGULATED REVENUES

$$VRG^a = Capex^a + FoNI^a + Opex^a + ERC^a + RC_{TOT}^a$$

INFRASTRUCTURES COSTS

- Only already realized investments (2 years lag)
- Only standardised financial and fiscal costs, not margins

COMPONENT IN SUPPORT OF SPECIFIC INVESTMENT OBJECTIVES

- Sum to be spent in 2 years for **investments** realization

OPERATING COSTS

- Endogenous costs: strict efficiency
- Updatable costs: only specific efficiency formulae – ***NEW,*** incentive to reduce energy consumption + extra-cost for sludge disposal
- **Specific purposes costs**

ENVIRONMENTAL AND RESOURCE COSTS RECOVERY

To distinguish:

- Resource and environment: functional distinction
- Endogenous and updatable Opex
- Infrastructures costs

COMPONENT TO RECOVER COSTS RELATED TO PREVIOUS YEARS BALANCE

NEW:

- Specific incentive to innovative and multi- sector measures, aimed to energy and environmental sustainability

Investments support | Efficiency push | Financial-economic balance

Focus on Capital costs

$$Capex^{a} = AMM^{a} + OF^{a} + OFisc^{a} + \Delta CUIT^{a}_{Capex}$$

- AMM^{a}: DEPRECIATION
- OF^{a}: FINANCIAL COSTS
- $OFisc^{a}$: FISCAL COSTS
- $\Delta CUIT^{a}_{Capex}$: "PROPERTY OWNER" COSTS

CRITERIA:

- **depreciation** calculated on realized assets (only if previously planned) using:
  - useful lives
  - monetary revaluation
- **standard financial & fiscal** cost based on:
  - net invested capital structure
  - standardized ratio debt/equity (=1)

E.g. Depreciation lives for aqueduct activities

Activity	Macro-indicator	Assets	Years for depreciation
Aqueduct	M1-M2-MC1	Pipelines	40
	M1-M2-M3	Hydraulic infrastructures	40
	M1-M2	Tanks	40
	M1-M2-M3	Lifting equipment and pumps	8
	M3	Drinking water treatment plants	20
	M3	Other drinking water treatments (e.g. disinfection, filtration, softening…)	12
	M1-MC1-MC2	Meters	10
	M1-M2-M3	Information systems	5
	M1-M2-M3	Telecontrol and data transmission systems	8

Main novelties in MTI-3:

- in order to push for a fast realization of **work in progress**:
  - not in tariffs if not moved for 4 years
  - rate below asset rate, and decreasing in time
- depreciation lives update since 2018 and explicitly link to technical and contractual quality parameters (IMP), to assure better **cost-reflectivity**

Some key data: …effects on regulated revenues and tariffs

Source: Annual Reports 2015-2022 (ARERA)

**ERC included*

VRG	2014	2015	2016	2017	2018	2019	2020	2021
Capex*, FoNI	24%	25%	26%	28%	30%	30%	31%	30,8%
Opex*	74%	72%	71%	68%	67%	67%	68%	68,8%
RC	2%	3%	3%	5%	3%	3%	1%	0,4%
% of population	67%	67%	58%	66%	51%	56%	61%	76%

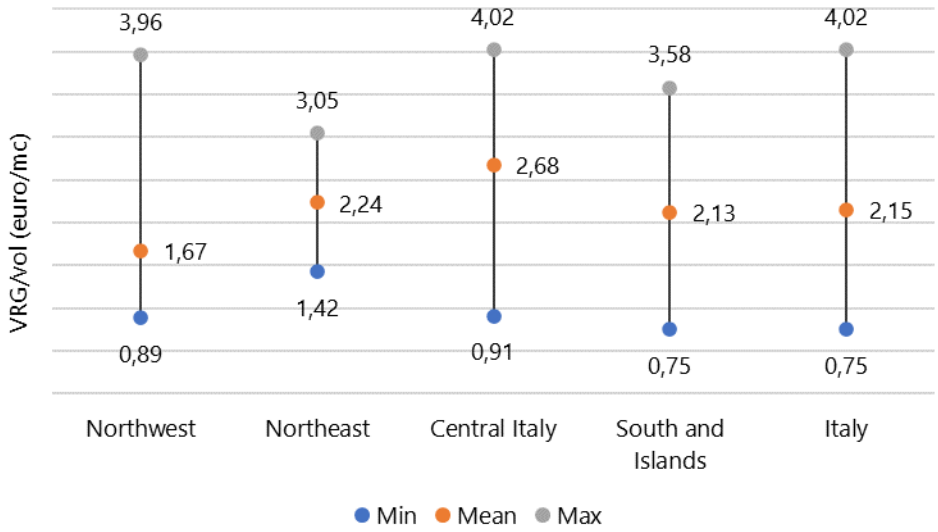
- Overall VRG 2021: **7,2** billion euro

Regulated revenues (VRG) 2014-2021:
- Capex component increased (24% to 31%)
- Opex component decreased (74% to 69%)

- Increase in tariffs to end users depend more on realized investments than operating expenditures.

- On average, the increase in tariffs to end users accounts for about 2,9% for each year since 2014.

- In 2021, annual expense for a domestic user is 2,15 (€/mc).



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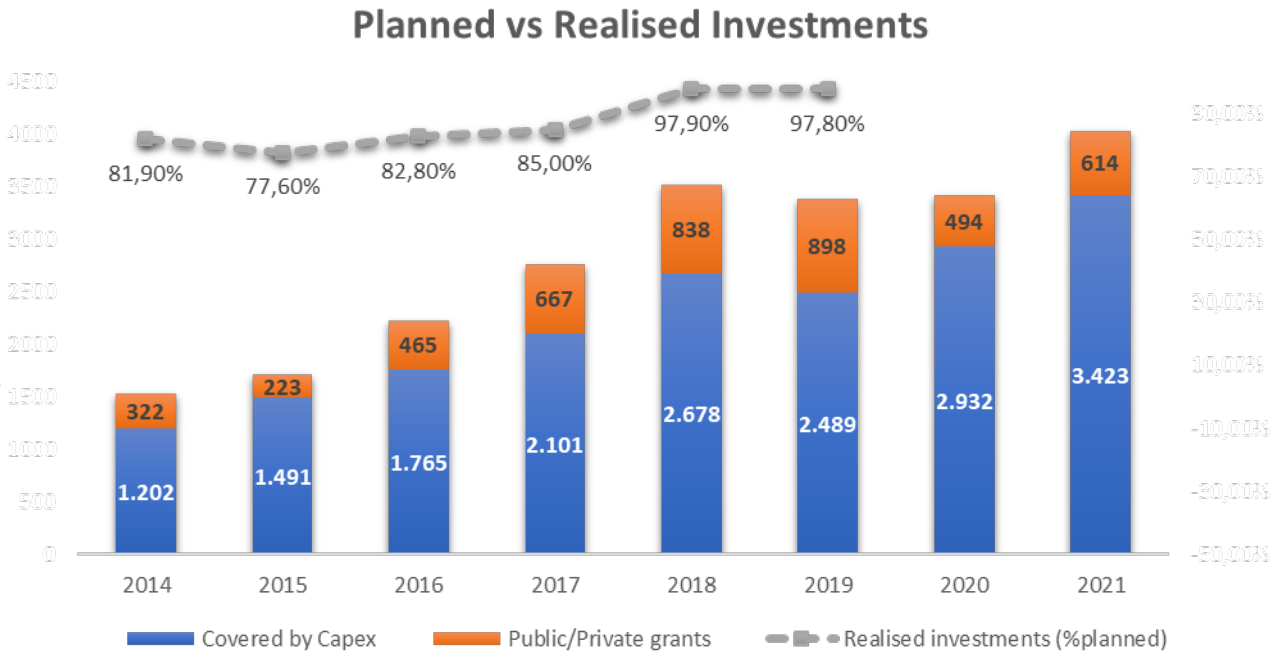
Some key data: Planned vs Realised Investments

2020-2023
263
€/per capita

RQTI EFFECTS:
- An increase in Planned Investments
- Technical quality is increasing among operators in terms of water losses, service interruptions, sewerage system adequacy, sludge disposal and wastewater treatment
- **Strong positive correlation between realised investments and performances in technical quality**

Since 2014:
- CAGR 14-21 +14,9% Planned Investments
- Similar trend in realised investments 97,8% in 2019

In the third regulatory period:
- Planned investments 2020-2023 per capita are about 263€ (65,75 euro per year)



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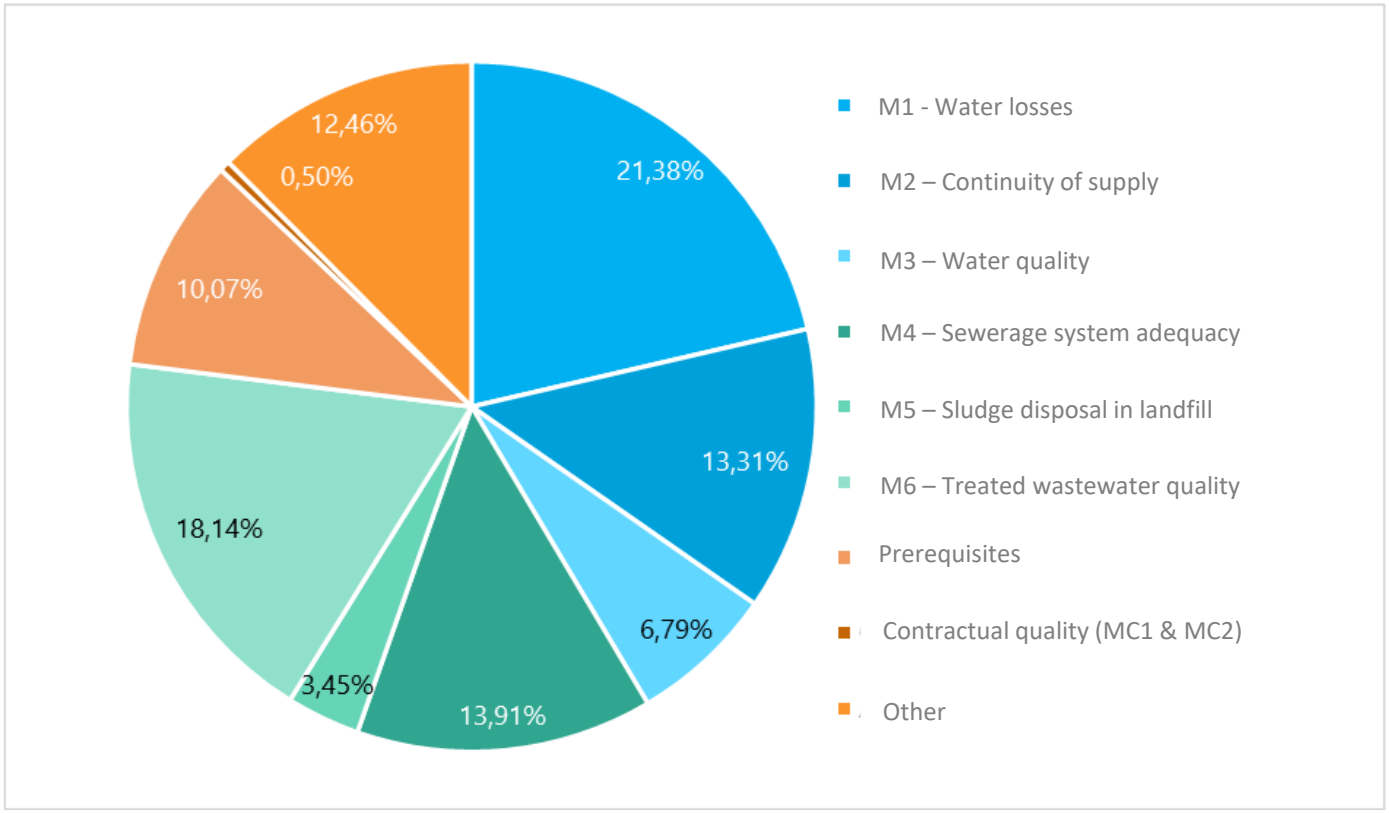
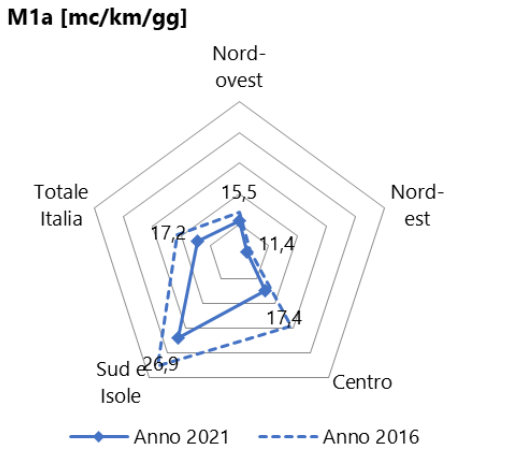
Planning vs technical quality

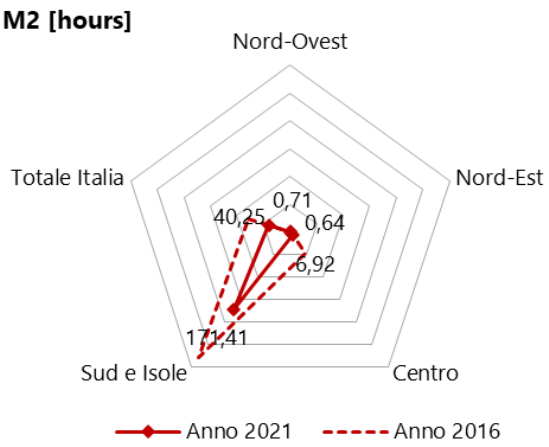
Distribution of planned investments 2020-2023



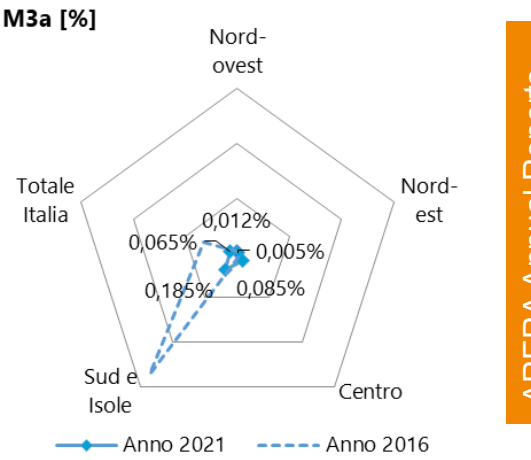
Technical quality macro-indicators: results



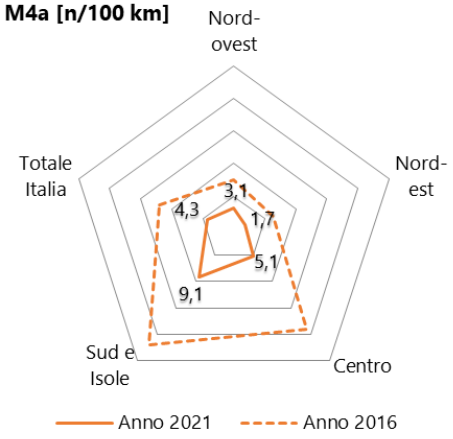
M1 – WATER LOSSES



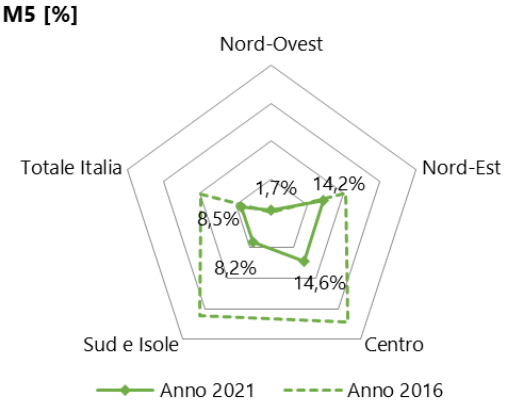
M2 – CONTINUITY OF SUPPLY



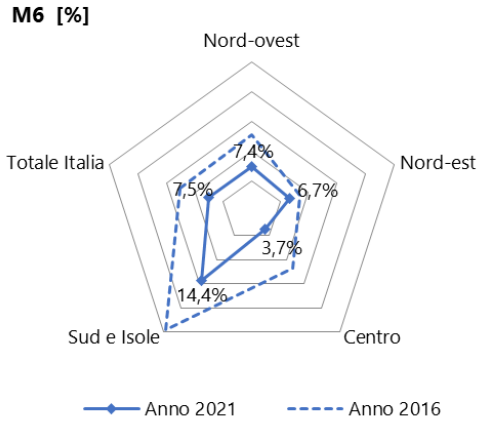
M3 – WATER QUALITY



M4 – SEWERAGE SYSTEM ADEQUACY



M5 – SLUDGE DISPOSAL IN LANDFILL



M6 – TREATED WASTEWATER QUALITY

ARERA Annual Reports 2021 - 2022

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Award/penalty mechanism for technical quality

Symmetric, multi Stages mechanism to incentivize technical quality performance

	basic	advanced	excellence
Obligation to maintain the state of efficiency (class A)	▪ (not) maintaining "A class"	▪ the best (worst) 3 operators for each macro-indicator	▪ The best 3 operators, considering all macro-indicators
Obligation to improve efficiency (other classes)	▪ overcoming (not reaching) the improving efficiency target	▪ The best 3 improvements (the worst 3 failures) for each macro-indicator	

Predefined "jackpot" (minority game theory)

Award/penalty in % of regulated revenues

TOPSIS method for scoring

Technique for Order of Preference by Similarity to Ideal Solution

Award/penalty mechanism first application (years 2018-2019):

EUR 135 million (10% financial & fiscal cost in tariff per year)

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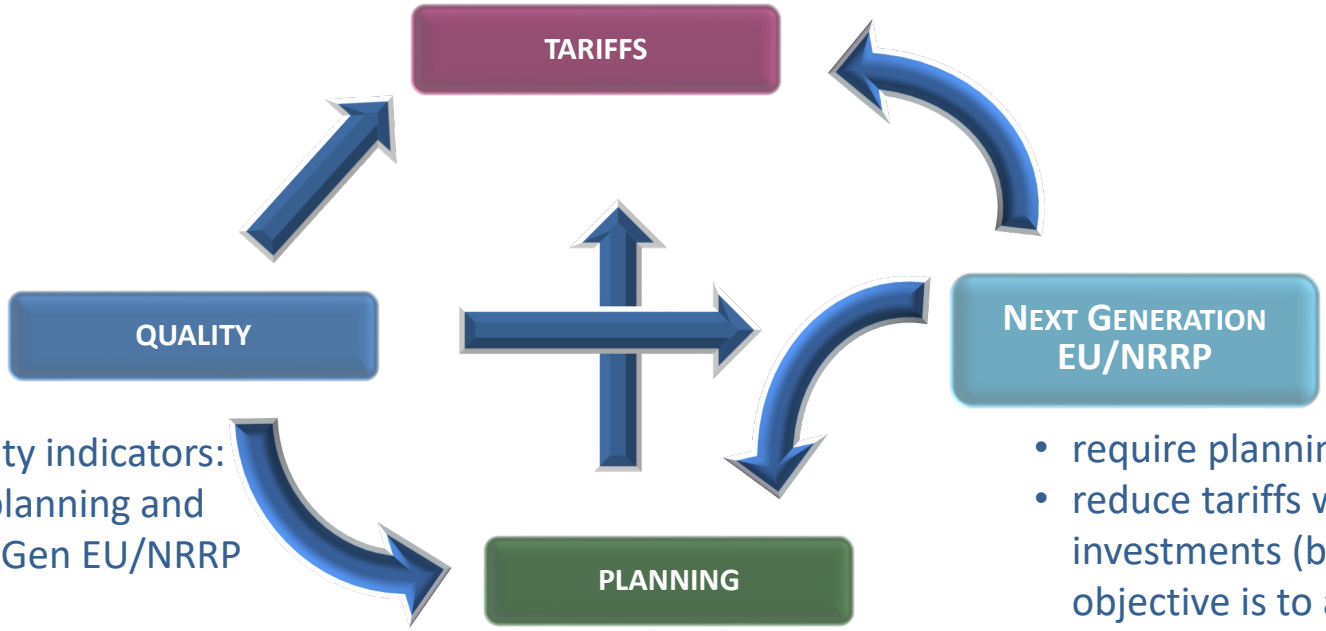
Interrelation among regulatory and not regulatory instruments

Close link among regulatory and non-regulatory instruments

- Quality is a target finance quality improvements



technical quality indicators:

- determine planning and define Next Gen EU/NRRP objectives
- contribute to determine the efficient frontier for endogenous operating costs
- determine relevant payoffs (total premiums amounts to 10% of OF+Ofisc)

- require planning update
- reduce tariffs with stable investments (but the objective is to accelerate investments)

- include measures to achieve quality targets
- consider the amount of public contributions

Next Generation EU for water and sanitation services

M2 - GREEN REVOLUTION & ECOLOGICAL TRANSITION M2C4 - ENVIRONMENT PROTECTION & WATER RESOURCES	
Measure	(Bill. Euro)
4. Garantire la gestione sostenibile delle risorse idriche lungo l'intero ciclo e il miglioramento della qualità ambientale delle acque interne e marittime	4,38
Investment 4.1: water infrastructures for guaranteeing the continuity of supply	2,00
Investment 4.2: water losses reduction in distribution networks, including digitalisation and network monitoring	0,90
Investment 4.3: resilience of agricultural irrigation for a better management of water resources	0,88
Investment 4.4: sewerage and wastewater treatment	0,60
Totale Componente	15,06

* nella misura in cui tali infrastrutture siano destinate all'approvvigionamento di usi idropotabili nell'ambito del Servizio Idrico Integrato

Tender REACT-EU 0,313 + 0,169

- M3 – WATER QUALITY
- M2 – CONTINUITY OF SUPPLY
- M1 – WATER LOSSES
- DATA AVAILABILITY & RELIABILITY - PREREQUISITE
- M4 – SEWERAGE SYSTEM ADEQUACY
- M5 – SLUDGE DISPOSAL IN LANDFILL
- M6 – TREATED WASTEWATER QUALITY
- COMPLIANCE TO WASTEWATER QUALLITY LEGISLATION - PREREQUISITE

Total 3,982 Bill. €

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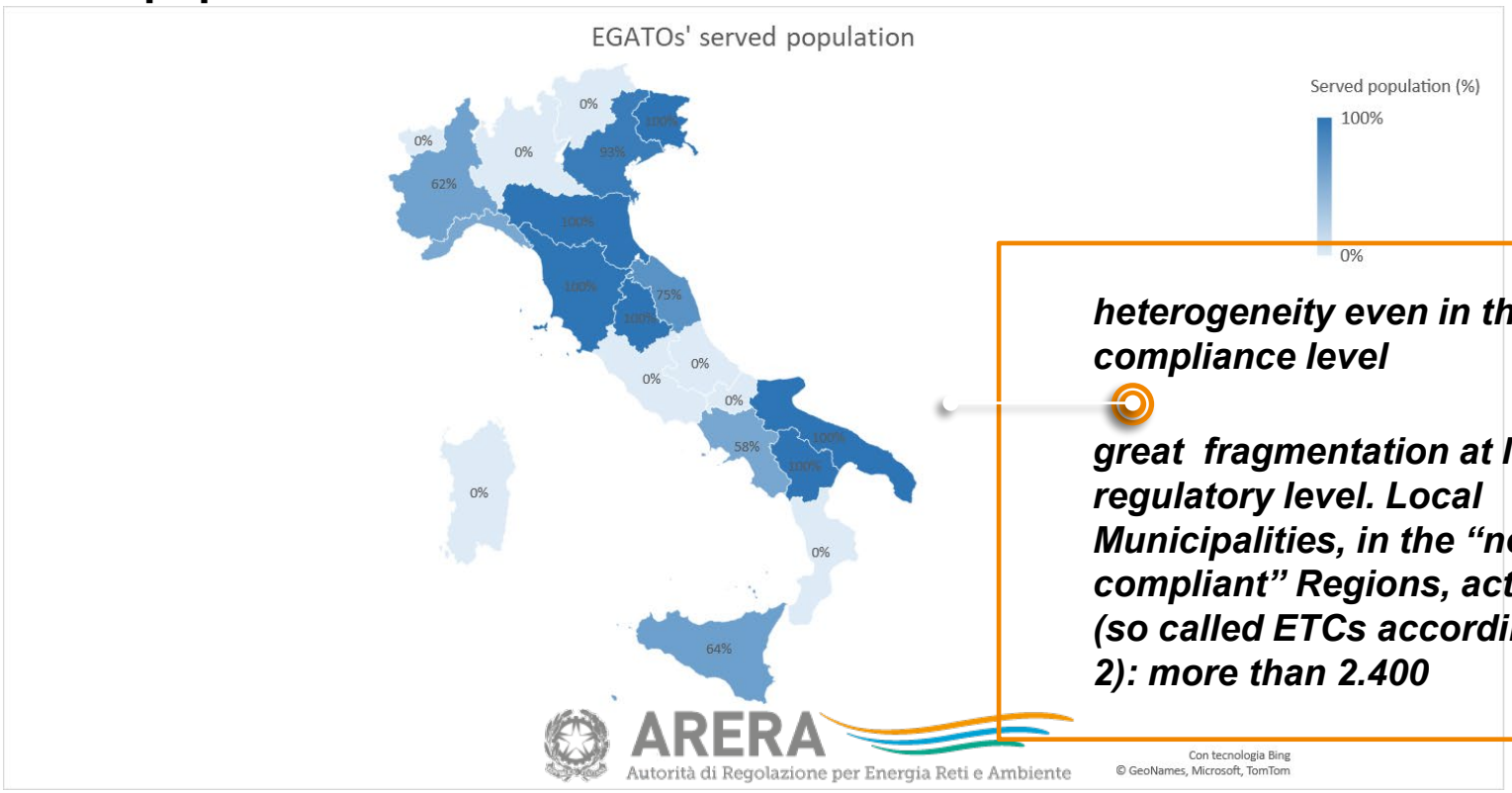
WASTE MANAGEMENT

Institutional setup of MSW sector

Heterogeneity in the **Regional choices**, **complex multi-tier governance structure**

Main issues related to

- Long-lasting delays, owing to territorial debate, in the **fulfillment of reform at decentralized level**
- at national level **58** districts/local Authorities (so-called "**ATOs**"/"**EGATOs**") have been **identified by Regions** corresponding to **51% of Italian population**



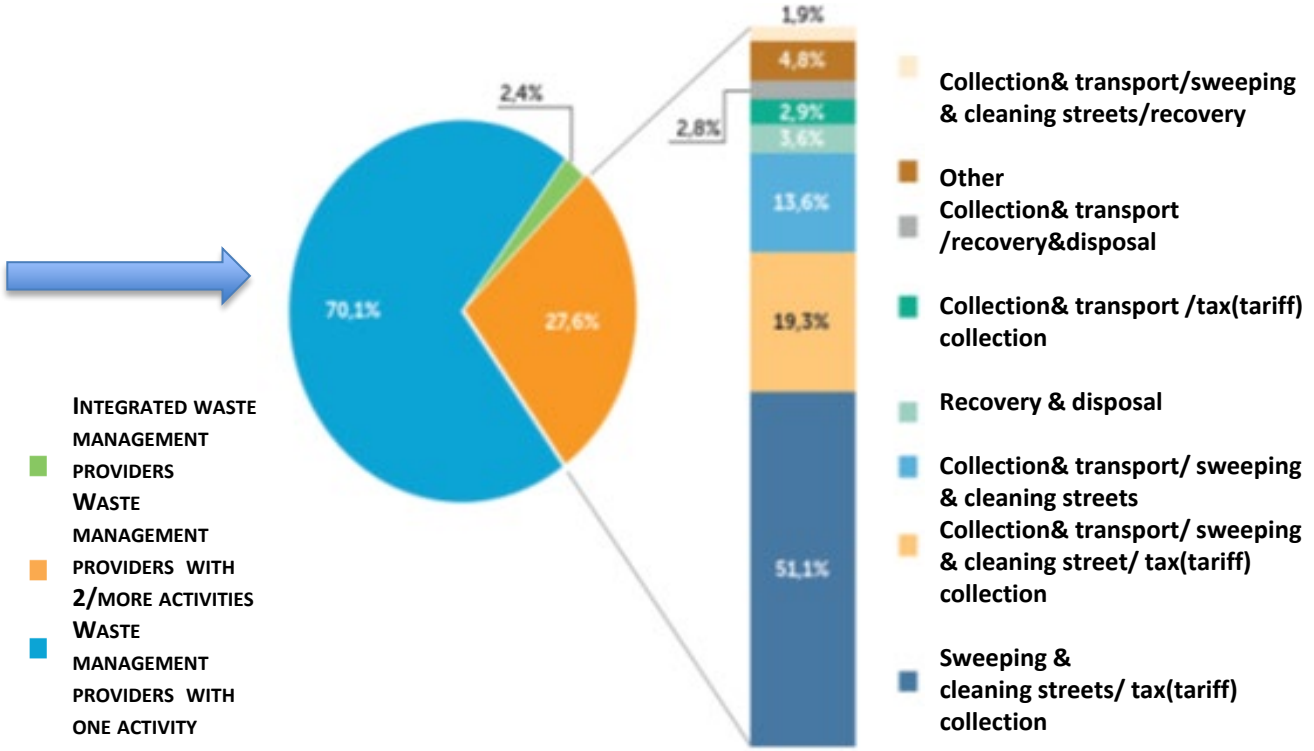
heterogeneity even in the compliance level

great fragmentation at local regulatory level. Local Municipalities, in the "non-compliant" Regions, act as EGATOs (so called ETCs according to MTR-2): more than 2.400

Waste management operators

Great fragmentation also in the waste management industry

Waste management providers operate mainly in one single phase (in particular tax collection activity)



SOURCE: ARERA (2021)

North/South divide in the waste treatment capacity

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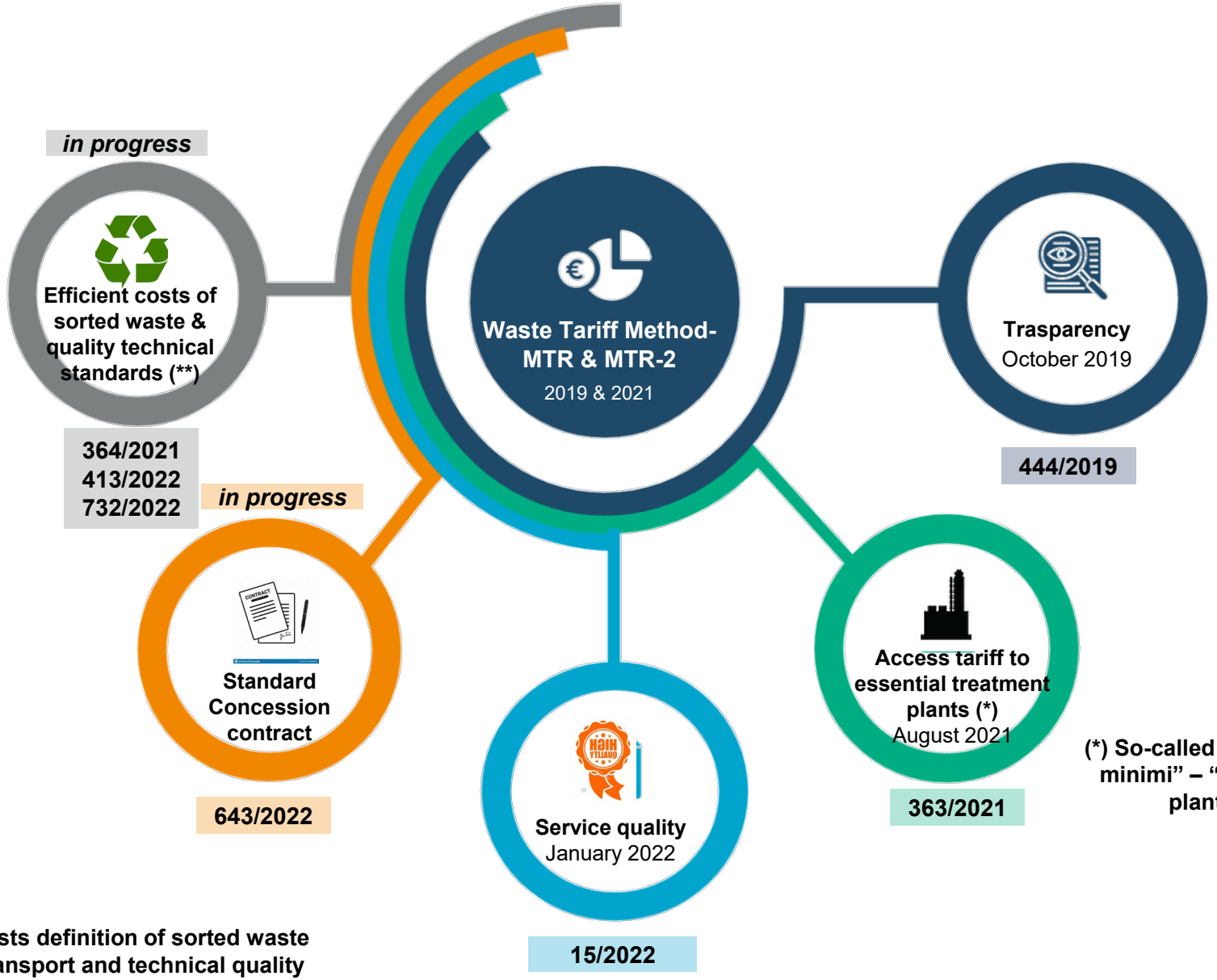
Main regulatory acts: an overview



(*) So-called "Impianti minimi" – "minimi" plants

(**) Efficient costs definition of sorted waste collection & transport and technical quality standards definition for recovery and disposal treatment activities

Cost components in Italian waste sector – MTR-2

$$\sum T_a = \sum TV_a + \sum TF_a$$

ANNUAL TARIFF REVENUES

VARIABLE COSTS

costs of unsorted waste treatment and disposal

costs of sorted waste collection and transport

incentivizing operating variable costs

sharing factor [0,3 ÷ 0,6]

revenues from EPR Consortia

final balancing variable costs

$$\sum TV_a = CRT_a + CTS_a + CTR_a + CRD_a + CO^{exp}_{116,TV,a} + CQ^{exp}_{TV,a} + COI^{exp}_{TV,a} - b_a(AR_a) - b_a(1+\omega_a)AR_{sc,a} + RCtot_{TV,a}$$

costs of unsorted waste collection and transport

costs of sorted waste treatment and recycling/recovery

expected costs related to both new Municipal solid waste definition and new options for business users to exit public service

revenues from the sale of material and energy from waste

sharing factor [0,1 ÷ 0,4]

Forecast costs to be compliant with ARERA's new quality standards

FIXED COSTS

common costs (costs of managing tariffs)

$$\sum TF_a = CSL_a + CC_a + CK_a + CO^{exp}_{116,TF,a} + CQ^{exp}_{TF,a} + COI^{exp}_{TF,a} + RCtot_{TF,a}$$

costs of street sweeping & cleaning

capital costs

incentivizing operating fixed costs

final balancing fixed costs

Annual limit to growth of revenues – MTR-2

$$\frac{\sum T_a}{\sum T_{a-1}} \leq (1 + \rho_a)$$

LIMIT TO ANNUAL GROWTH OF REVENUES

where:

$$\rho_a = rpi_a - X_a + QL_a + PG_a$$

- rpi_a: Inflation forecast rate (1,7%)
- X_a: factor taking into account efficiency improvement (0,1% ÷ 0,5%)
- QL_a: Δ of performance quality
- PG_a: Δ of scope of managed activities

		MANAGED ACTIVITIES SCOPE (PG_a)	
		No variations	**Increase**
PERFORMANCE QUALITY (QL_a)	Maintenance of quality levels	BOX I coefficient values: $PG_a = 0$ $QL_a = 0$	BOX II coefficient values: $PG_a \leq 3\%$ $QL_a = 0$
	Improvement of quality levels	BOX III coefficient values: $PG_a = 0$ $QL_a \leq 4\%$	BOX IV coefficient values: $PG_a \leq 3\%$ $QL_a \leq 4\%$

Asymmetrical approach

A further parameter ($C116_{,a}$) can be added - up to 3% - to cover forecast cost components $CO^{exp}_{116,TV,a}$ and $CO^{exp}_{116,TF,a}$

The amount of recoverable costs (and coherently of fees/taxes/tariffs) can increase only in case of higher performance, QL_a, or changes in the scope of waste management PG_a

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Other relevant elements – MTR-2

1. According to MTR-2 the incoming operator has to pay the outgoing operator a residual value, $VRSa$, valued as:

$$VRS_a = VR_a + VR_{RC,a}$$

$VR_{RC,a}$: costs not yet recovered, to be paid to the outgoing operator

VRa: the residual value of assets whose ownership is transferred to the incoming operator, calculated as

$$VR_a = \sum_c \sum_t [(CI_{c,t} - FA^a_{CI,c,t}) * dfl^a_t] + LIC_a$$

Uniform regulation of the takeover procedure and of the methods for paying the reimbursement value to the outgoing operator are under definition: see procedure currently under consultation about the definition of concession contract schemes

2. Rules for recognizing costs aimed at promoting plant development (the greater the associated risk, the higher the rate of return on invested capital)

$$CK_a = Amm_a + Acc_a + R_a + R_{LIC,a}$$

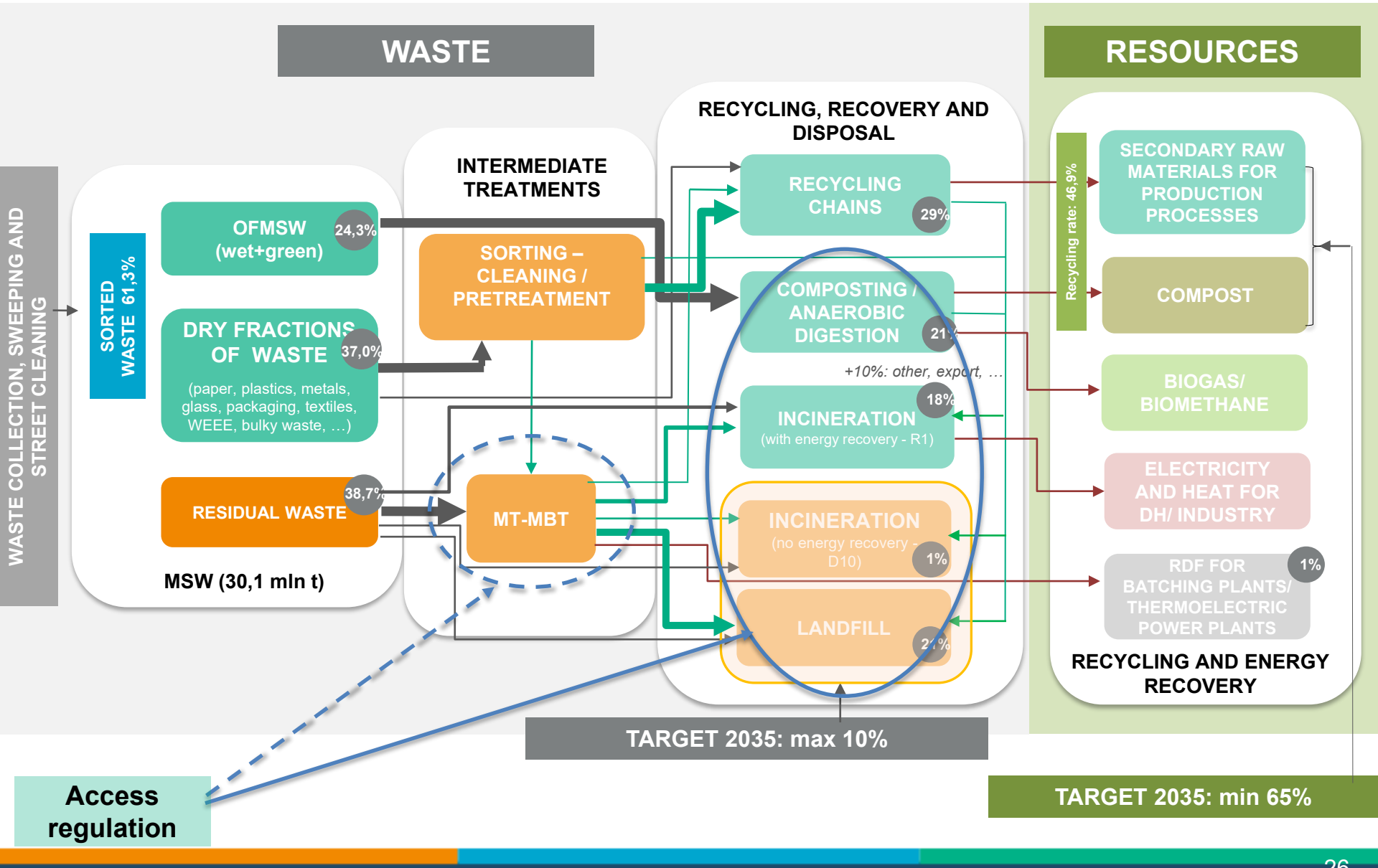
$$R_{LIC,a} = (S_{LIC,a} * LIC_a)$$

$$R_a = (WACC_a * CIN_a)$$

	MSW management
$WACC_a$	5,6%
$WACC_{RID,a}$	5,2%
Kd_a^{real}	1,86%

	Treatment activities
$WACC_a$	6,0%
$WACC_{RID,a}$	5,6%
Kd_a^{real}	1,86%

Focus on Access tariff Regulation: Waste Management Chains and Resources



Matrix of regulatory options – Access tariff regulation

Territorial Decisions on Integration	Technologies		Minimum Plant by Definition	Minimum Plant by Planning Choice	Additional Plant by Planning Choice
	Integrated operator		Tariff regulation *tout court*, with incentive (through environmental compensations) according to the hierarchy		
	Non-integrated operator	**Composting/ anaerobic digestion**		Regulation of tariffs/ costs and environmental compensations, with incentives in favor of those who confer	No tariff regulation *tout court*, but transparency obligations on the conditions of access
		Incineration *(with energy recovery - R1)*		Regulation of tariffs/costs and environmental compensations, with limited incentives in favor of those who confer	No tariff regulation *tout court*, but transparency obligations on the conditions of access
		Landfill/ Incineration *(without energy recovery - D10)*		Regulation of tariffs/costs and environmental compensations, with disincentives for those who confer	No tariff regulation *tout court*, but transparency obligations on the conditions of access and disincentives for those who confer

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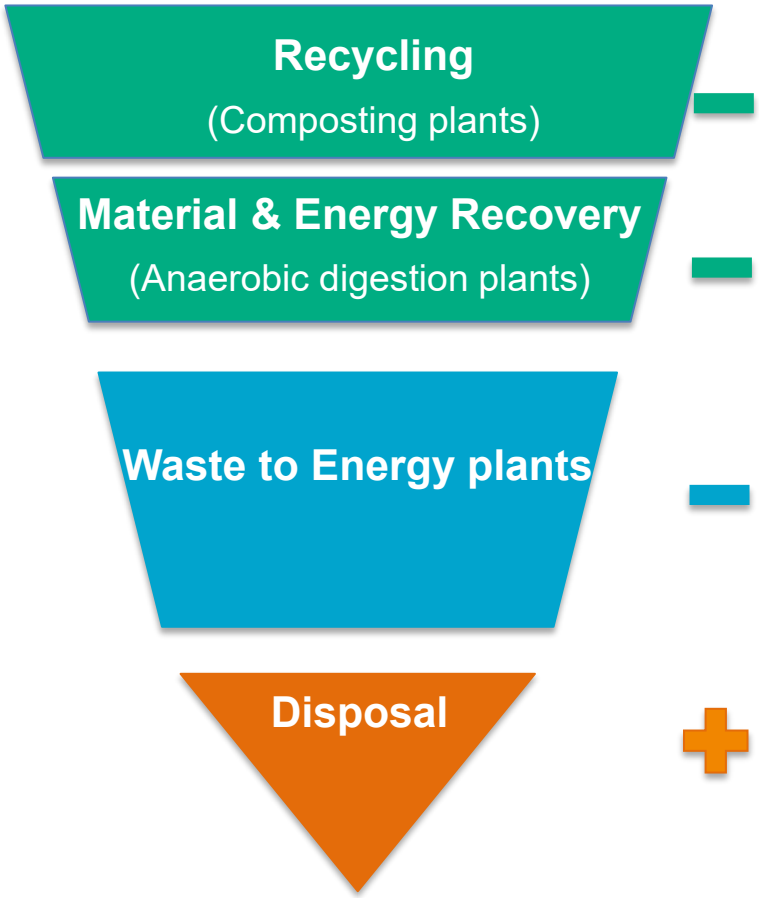
Economic instruments to promote compliance with European waste hierarchy with disposal as the last resort

Waste Hierarchy



Environmental cost components in the incentive mechanism

$C_{rec}(-)$ [€/t] **negative** environmental cost component aimed at reducing fees for waste flows to:

- composting plants
- anaerobic digestion plants

$C_{inc}(-)$ [€/t] **negative** environmental cost component aimed at reducing fees for waste flows to waste-to-energy plants (only in case of satisfactory performance in terms of sorted waste percentage and quality of collected sorted waste streams)

$C_{smal}(+)$ [€/t] **positive** environmental cost component aimed at increasing fees for waste flows to incinerators (without energy recovery) and to dumps

Design of Environmental Balancing cost components progress

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Moving towards a Circular Economy
Italian NRRP – Mission M2C1: «Sustainable Agriculture and Circular Economy»

SUSTAINABLE AGRICULTURE AND CIRCULAR ECONOMY

ACTION PLAN AND FINANCIAL RESOURCES

5,27
€ Billion
Total

60% of funding to be allocated to Italian central-southern regions

Scope and Actions	Total [Billion]
1. Circular Economy and Improvement of the Integrated Waste	2,10
Investment 1.1: Revamping existing plants and construction of new plants for the exploitation and closure of the waste cycle	1.50
Investment 1.2: "Flagship" projects with high innovative content	0,60
Reform 1.1: National strategy for the circular economy	
Reform 1.2: National Program for Waste Management	
Reform 1.3: Providing support and technical expertise to local Authorities	
2. Sviluppare una filiera agroalimentare sostenibile	2,80
Investimento 2.1: Sviluppo logistica per i settori agroalimentare, pesca e acquacoltura, silvicoltura, floricoltura e vivaismo	0,80
Investimento 2.2: Parco Agrisolare	1,50
Investimento 2.3: Innovazione e meccanizzazione nel settore agricolo ed alimentare	0,50
3. Sviluppare progetti integrati	0,37
Investimento 3.1: Isole verdi	0,20
Investimento 3.2: *Green communities*	0,14
Investimento 3.3: Cultura e consapevolezza su temi e sfide ambientali	0,03

INVESTMENT 1.1

Interventions aimed at **bridging the waste management gaps** relating to both **plants installed capacity** and **quality standards** among different Italian regions/areas, in order to make up for delays in **achieving the current and new objectives** set by European and national laws
Scope: improvement of the MSW **separate collection network, construction of new treatment/recycling plants** for organic waste, multi-material, glass, paper packaging and construction of innovative plants for particular waste streams

INVESTMENT 1.2

Interventions aimed at **strengthening the sorted waste collection** network and **building innovative treatment and recycling plants** to achieve the following recycling targets: 55% WEEE; 85% paper/cardboard; 65% plastic waste; 100% recovery of the textile sector

REFORM 1.2

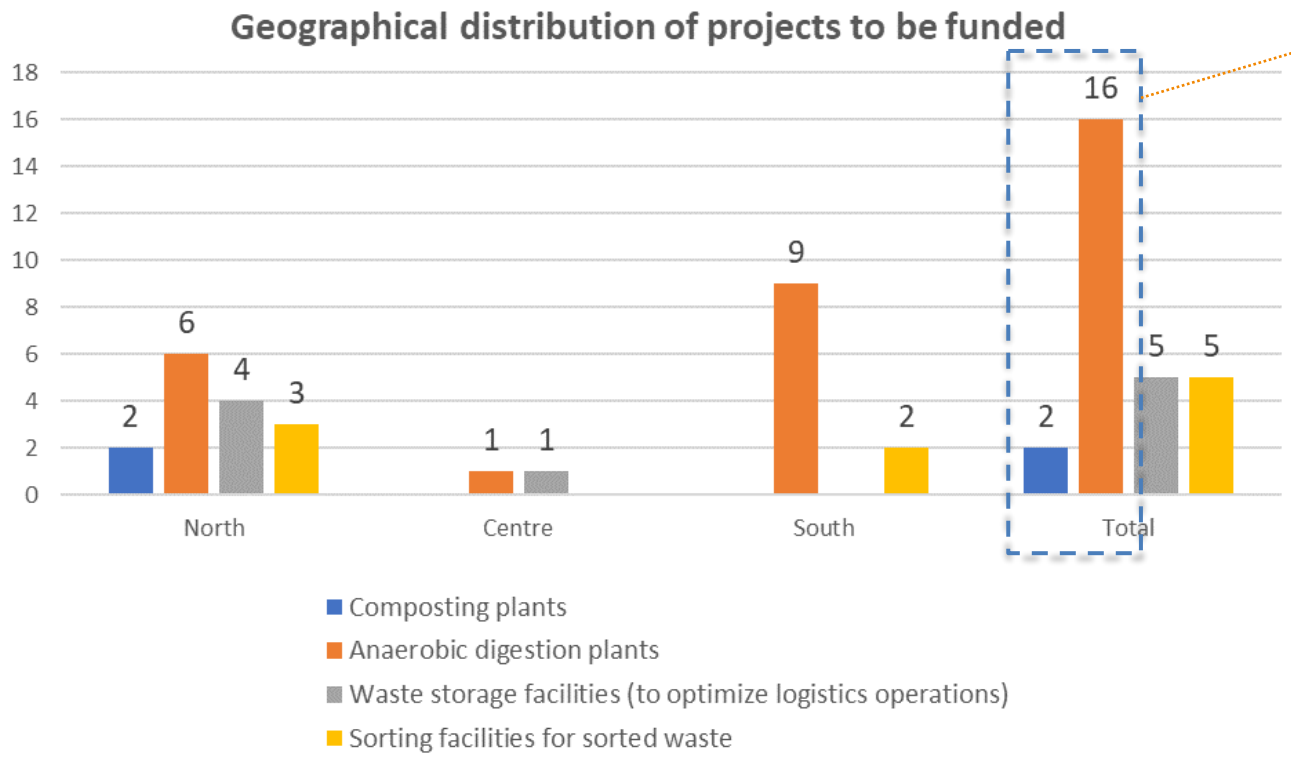
Development of a National Program for Waste Management (**PNGR**), aimed at **promoting**:

- **sustainability** in the **use of resources** and **reduction** of potential **negative environmental impacts**
- gradual **mitigation of socio-economic gaps**
- **awareness and virtuous behavior** of economic actors and citizens for **waste reduction and valorization**
- **management of the waste cycle** aimed at **achieving climate neutrality goals**

On-going cooperation between Ministry of Environment & Energy (MASE) and ARERA

INV. 1.1-B line: Revamping or expansion of existing plants and construction of new treatment/recycling plants for municipal sorted waste (total amount: € 450 million)

- 28 Projects to be funded (max grant: 40 million for each project)



Plants eligible for being classified as «essential plants» by Regional planning (so-called «Impianti minimi»)

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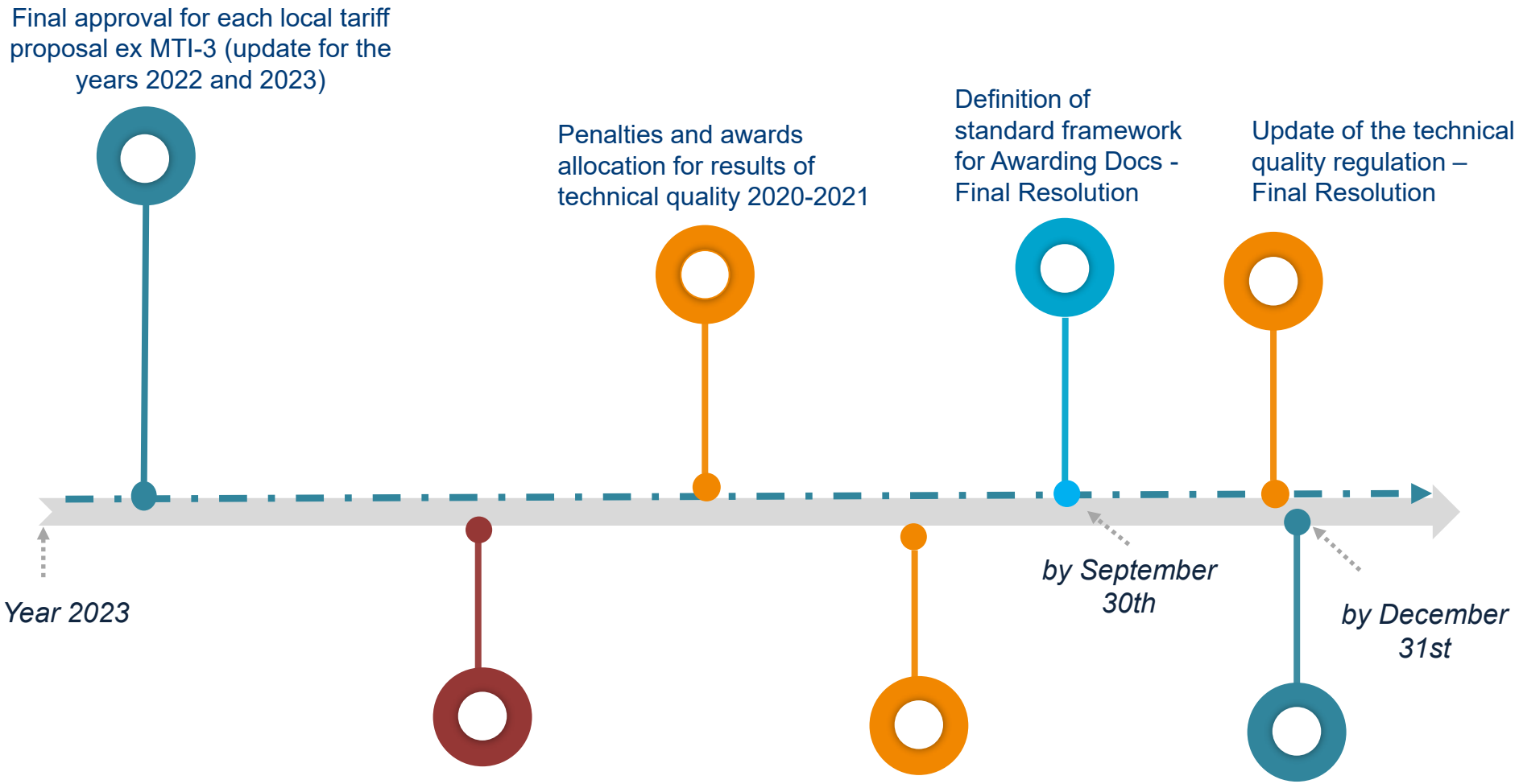
HOPES, FORECASTS AND REASONABLE EXPECTATIONS



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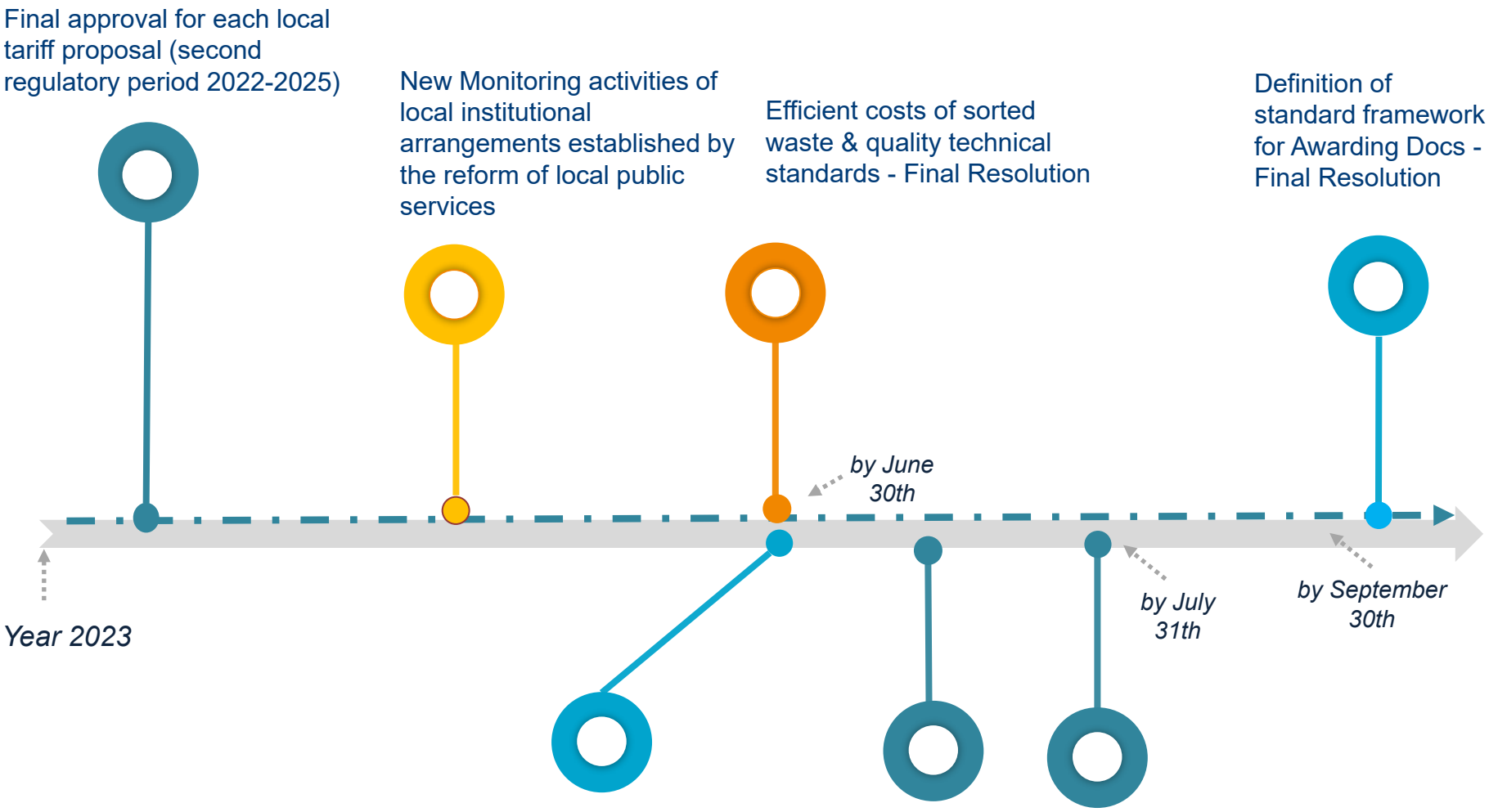
WASTE



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