



Response to ARERA's DCO 488/2021/R/COM on the cost of capital for Italian energy networks

Prepared for Utilitalia, Terna, Snam Rete Gas, Enel, ASSOGAS, ANIGAS and IGAS

2 December 2021

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1 | Introduction

Introduction

- On 11 November 2021, the Italian Regulatory Authority for Energy, Networks and Environment (ARERA) published consultation document 488/2021/R/com (hereafter **DCO 488/21**) setting out its final proposal regarding the methodology for estimating the cost of capital for Italian energy networks and infrastructure companies for the second regulatory period starting on 1 January 2022 (II PWACC).
- In this context, NERA Economic Consulting (**NERA**) has been commissioned by Utilitalia, Terna, Snam, Enel, Assogas, Anigas and Igas to review ARERA's final proposals contained in DCO 488/21, which we provide in the remainder of this report.
- Overall we welcome ARERA's methodological improvements with regards to some of the cost of capital parameters, but we identify a series of inconsistencies and flaws in ARERA's final proposals to estimating some of the WACC parameters, and propose a revised approach to estimating those for II PWACC.
- The remainder of this report is organised as follows:
 - Section 2 reviews ARERA's approach to calculating the Forward Premium (FP) across parameters;
 - Section 3 reviews ARERA's approach to estimating the Total Market Return (TMR);
 - Section 4 reviews ARERA's approach to inflation and its use across the WACC parameters;
 - Section 5 reviews ARERA's approach to reviewing the asset beta; and
 - Section 6 summarises our observations on the other risk-free rate components.
- This report should be read alongside our report "Response presentation to ARERA's DCO 308/2021/R/com on the cost of capital for Italian energy networks" dated 10 September 2021 accompanying the companies' submission and which reviewed and responded to ARERA's first consultation document (DCO 208/2021/R/com) published on 15 July 2021.

2 | Forward Premium

ARERA has proposed including a Forward Premium (FP) in the calculation of the RF nominal, Country Risk Premium and in the cost of new debt

- ARERA has proposed including a Forward Premium (FP) in the calculation of the nominal risk-free rate (FP^{RF}), in the Country Risk Premium (FP^{CRP}) and in the cost of new debt (FP^{Kd}).
- In general, ARERA proposes to estimate the FP by taking the difference between the observed spot rate and the forward rate over a given time horizon.
- The forward rate captures the expected interest rate and is estimated with reference to the spot rates of bonds with different maturities using the following formula:

$$Forward\ rate = \left[\frac{(1 + ia)^{t_a}}{(1 + ib)^{t_b}} \right]^{\frac{1}{t_b - t_a}} - 1$$


where i_a is the yield on bond a of t_a periods; and i_b is the yield on bond b of t_b periods

- In practice, we understand ARERA proposes to calculate each FP as summarised in the Table below.

Parameter	ARERA's Proposed Approach in DCO 488/21
FP^{RF}	<ul style="list-style-type: none"> • ARERA proposes to calculate the FP^{RF} with reference to AAA Eurozone government bonds, using ECB data. • ARERA proposes to calculate the FP with reference to the mid-point of the regulatory period 2022-24, but in practice suggests using the month of September 2023 to account for the “timing of the WACC parameters updates” ¹ • Taking as observation data Sep 21, ARERA estimates a FP^{RF} of 0.25% using 1-month average of the observed spot rates. • ARERA also notes that for consistency with the RF averaging period, it may consider estimating monthly averages of the observed spot rates at 3 or 4 points in time over the horizon up to September 2023
FP^{CRP}	<ul style="list-style-type: none"> • ARERA defines FP^{CRP} as the “<i>expected spread between Italian government bond yields and yields on bonds from Eurozone countries with a rating of at least AA according to S&P, set in real terms</i>” ² • We assume ARERA will adopt the same approach as proposed for the FP^{RF} in terms of averaging period and observation window.
FP^{Kd}	<ul style="list-style-type: none"> • Same as FP^{RF}

We generally agree with the inclusion of a FP but identify the following inconsistencies and flaws in ARERA's suggested approach for the FP^{RF}


1. The use of AAA-only bonds for estimating the FP^{RF} is inconsistent with the reference credit rating used to estimate the RF nominal.

- ARERA dismisses the use of AA-government bonds on grounds that "there is limited data availability and that their inclusion does not materially impact the results".¹
- ARERA's argument contradicts with its use of AA-rated government bonds in the calculation of the RF nominal, and the lack of data available from the ECB dataset should not justify introducing a methodological inconsistency in the calculation of the risk-free rate.
- Also, unlike stated by ARERA our analysis shows that failing to include AA-rated government bond forward rates understates the FP by about  as show in Table 1 below.²

2. The use a 1-month average to smooth volatility in the FP estimates is inconsistent with the averaging period used to determine the RF nominal.

- As noted in the previous slide, from our review of ARERA's DCO 488/21 we understand ARERA might be considering estimating the FP at different points in time for consistency with the RF nominal averaging period.
- We broadly agree with ARERA's proposal, and recommend estimating the RF nominal and FP consistently over the same time horizon (e.g., by taking the 1-year average of both the RF nominal and FP parameters).

Table: Forward Premium Estimates using AAA- and AA-rated Government Bond Yields

		ARERA Estimate	NERA Estimate	
Averaging period	Reference	AAA	AAA (2 countries)	AAA-AA (4 countries)
	Source Data	ECB		
	Cut off:			
	1-month 30 Sep 2021	0.25%		
	1-year 30 Sep 2021	-		
	1-year 30 Oct 2021	-		

Using both AAA- and AA-rated bonds and a 1-year averaging period, **we estimate a FP^{RF} of**



Sources: NERA review and translation of (1) ARERA, DCO 488/21, para. 7.20 (a). (2) NERA analysis of financial market data relying on yield curves on the AAA-AA 10Y governments bonds used for the RF calculation (Germany, Netherlands, France and Belgium).

We also agree with the inclusion of a FP in the cost of new debt, but identify an inconsistency with ARERA's approach to estimating that parameter

ARERA has proposed to use the same FP for setting the RF nominal and the new cost of debt. However, we note that:

1. **ARERA's approach inconsistent with the credit rating used to estimate the cost of debt (BBB)** and fails to acknowledge the difference in reference ratings used to calculate the RF nominal (AAA-AA) relative to the cost of debt.
2. **ARERA's approach is inconsistent with its own proposal to include a FP^{CRP}** calculated as spread between Italian and high-rated forward premiums. Indeed, the rationale for including a CRP-specific forward premium and cost of debt-specific premium is the same:
 - If the CRP or cost of new debt are not indexed and calculated using a short-run averaging period, a FP is required to capture the value of the expected future spread between Italian government bond yields and AAA-AA government bond yields (for the CRP) and the value of the expected future yields on BBB-bonds (for the new cost of debt).
- As the Table shows, the forward premium for BBB bonds (Italy and Portugal) of is markedly higher than the forward premium associated with AAA-AA European bonds (Germany, Netherlands, Belgium and France) of .
- This empirical evidence suggests a higher expected yield for BBB-rated bonds than AAA-AA bonds and that failing to capture this difference in expectations would markedly under-estimate the cost of new debt for Italian network companies.

Table: Forward Premium Estimates using AAA-AA- and BBB- rated Government Bond Yields

Average period	Cut-off	FP for 10Y AA-AAA govt bonds	FP for 10Y BBB govt bonds	Difference
1-year	30 Sep 2021	<input type="text" value="X"/>		
	31 Oct 2021			

Based on the above, we recommend a **forward premium for the cost of new debt (FP^{Kd})** of calculated with reference to BBB-rated to capture the expected increase in cost of issuing new debt for BBB-rated companies.

Conclusions and recommendations

- To conclude, we generally agree with the inclusion of a FP but identify a number of inconsistencies and flaws in ARERA's suggested approach which if not addressed may under-state the cost of capital for Italian energy network companies.
- We therefore recommend:
 - Estimating the FP^{RF} with reference to both AAA- and AA-rated government bonds (consistently with the RF nominal) over a 1-year historical period, or a consistent window used for the RF calculation.
 - Estimating the FP^{CRP} adopting the same consistent historical period used for the FP^{RF} and RF nominal.
 - Estimating the FP for the cost of debt FP^{Kd} with reference to BBB-government bonds using a consistent historical period used for the RF nominal and the other FP parameters.
- The Table below summarises our FP estimates adopting our recommended approach.

Table: Forward Premium Estimates for the RF nominal, CRP and Cost of New Debt

	FP^{RF}		FP^{CRP}	FP^{Kd}
	Reference Rating	10Y AAA-AA govt bonds	Difference in 10Y AAA-AA and Italian govt bonds*	10Y BBB govt bonds
Average period	Cut-off:			
1-year	30 Sep 2021	✂		
	31 Oct 2021			

Note: * Calculated as difference between the FP^{RF} and the FP calculated with reference to the 10Y Italian government bond yields over the same time horizon, in line with our approach outlined in slide 33 of our September 2021 Report. Sources: NERA analysis of financial market data.

3 | Total Market Return

ARERA's proposes a weighted average Total Market Return (TMR) approach with the Arithmetic Mean (AM) weighting “not less than 80%”

In DCO 488/21, ARERA proposes keeping its current approach to calculating the TMR of using a weighted average of the arithmetic mean (AM) and geometric mean (GM) estimates to compute the TMR, with an arithmetic mean weighting not less than 80%. In justifying its proposal, ARERA notes:¹

- Academic literature is not univocal in the use of the arithmetic mean, noting that “the estimate of future returns based on the AM of historical data is only appropriate in the case of an appraisal horizon of 1-year; whereas for time horizons beyond 1-year a weighted average of the GM and AM approach is preferable, with the weights of the AM and GM varying with the duration of appraisal”.
- The use of the arithmetic average only assumes a short-term investor horizon, which ARERA considers is not “with that typically associated with the utilities sector where there is also a large majority of institutional investors who have medium-long term horizons”.
- Its proposal to adopt a weighted average approach is “consistent with the approaches adopted by other European regulators, namely the recent cost of capital decision by the German regulator”.

We identify several flaws and inconsistencies in ARERA's proposal to maintain a weighted average approach to calculate the TMR, namely:

1. Dismisses its own advisor's recommendation of using the Arithmetic Mean (AM)
2. Relies on an inaccurate interpretation of the financial literature;
3. Relies on a selective and cherry picking approach to evidence from regulatory precedent.

We discuss each of these points in turn in the next slides.

Oxera supports the use of the arithmetic average to set the Total Market Return in a regulatory context

ARERA's approach is inconsistent with the recommendations from its own advisors (Oxera) of using the Arithmetic Average (AM) and is not supported by economic and financial theory.

- In its 2021 report to ARERA, Oxera notes that whilst there is a debate about the appropriate averaging method depending on the context, the **arithmetic mean is generally adopted for estimating “required equity returns”**, therefore supporting the use of the arithmetic mean in a regulatory context:¹

*“While there is debate about which is the more appropriate averaging method in any given context, in standard corporate finance textbooks the **arithmetic average is generally adopted for estimating the ERP to use when computing required equity returns**. Indeed, DMS themselves make the following statement “This [the arithmetic mean risk premium] is our estimate of the expected long-run equity risk premium for use in asset allocation, stock valuation, and corporate budgeting applications”.*
- **In the UK, Oxera have explicitly supported the use of the arithmetic mean to set the TMR in a regulatory context**, shown from quotes reported by companies and the Competition and Markets Authority (CMA) in the context of the RIIO-2 Appeals :
 - “As Oxera explains in its expert report, the **correct approach would be to use the arithmetic average of RPI-real returns**,”²
 - “Oxera has considered the evidence on serial correlation and the impact on average returns and concluded that “there is no strong evidence of serial correlation or predictability in returns. **Our recommendation is to use direct arithmetic averages of annual returns**”.”³
 - “as Oxera explained [...] there was **no empirical evidence that would justify the use in a price control setting of the geometric averaging approach**.”⁴

ARERA dismisses its own advisors' recommendation of using the arithmetic mean which is based on empirical analysis and extensive review of the financial literature, and collaboration with academics that also support the use of the arithmetic mean in estimating the TMR in price control setting (namely, Schaefer (2020) as we discuss in the next slide).⁵

Source: (1) Oxera (June 2021), Methodological review of the cost of capital estimation, p. 24-25. (2) SSEN Transmission, Notice of Appeal, Transmission Licence Modification RIIO-T2 Price Control, 3 March 2021, para. 1.39. (3) SSEN Transmission, Appellant's Reply Submission, 10 May 2021, para.3.19, letter (d). (4) CMA (28 October 2021), Final Determination Volume 2A: Joined Grounds: Cost of Equity, para. 5.239. (5) See for instance the following reference quoted in the SSNE Notice of Appeal: Schaefer, S. (2020), 'Using Average Historical Rates of Return to set Discount Rates', which is contained within the Oxera (2020), 'Deriving unbiased discount rates from historical returns'.

Recent academic and regulatory debate on TMR supports the use of the arithmetic average in a regulatory context

- As ARERA notes, academic literature presents different estimators which can be used to estimate expected returns in different contexts:
 - **Estimators of expected returns used for compounding** – Blume (1974) and JKM (2005) developed estimators of expected returns for the purpose of estimating future values of investment portfolios where the horizon/holding period is longer than 1 year. They show that for a horizon greater than 1 year, the unbiased estimator lies between the arithmetic mean (AM) and the geometric mean (GM) and closer to the AM the longer the historical period used to estimate the expected return relative to the investment horizon.
 - **Estimators of expected returns used for discounting** – Cooper (1996) developed an estimator of expected returns for the purpose of estimating present values of investments where the horizon/holding period is longer than 1 year. Cooper shows that for a horizon greater than 1 year, the unbiased estimator lies above the AM (and therefore also GM).
- Both academic papers above support estimating an ERP close to or above the Arithmetic Mean. They do not support ARERA's approach of using 80/20 AM/GM.
- The use of AM in the regulatory context has recently been supported by Schafer (2020): “...the rate of return set by regulators is not only used to calculate the expected future value of an investment, but also to calculate present values in capital budgeting decisions made by regulated companies... Since the adjustments in the expected return that are required to correct the biases for compounding and discounting are different, it is not possible to provide an expected return that is correct for both but, fortunately, this is not necessary... all the CMA needs to do is to provide an unbiased estimate of (say) the expected annual return. Compounders and discounters will then make their own adjustments to this number to adjust for the bias introduced by estimate error. Compounders will use rates [below the arithmetic average]..., discounters will use higher rates.”¹

Hence, whilst there is debate in the financial literature about the appropriate averaging period, this debate is not relevant in the decision about the allowed cost of capital in a regulatory context. The objective of the regulator is to estimate the expected *annual* return which supports the use of a simple arithmetic average.

ARERA's TMR proposal relies on a narrow, selective and cherry picking approach to evidence from regulatory precedent

ARERA's decision to quote the German precedent to support its weighted average TMR approach fails to appreciate the limitations of BNetzA's approach and wider German context, as we explain below.

- The German regulator (BNetzA) does not rely on a TMR approach to estimating the cost of equity, but instead still relies on an ERP *plus* RF approach.
- In its most recent decision for the 4th regulatory period (RP4), the BNetzA sets the ERP on the basis of historical data from 1900-2020 from the DMS database taking the mid-point of the arithmetic and geometric mean.
- BNetzA has relied on a weighted average approach for determining the ERP since its determination for the first regulatory period in 2009, and has justified this approach for RP4 on the basis of its own precedent and a “perceived controversy” during the consultation process around what is the most appropriate approach (AM vs. GM), against the background of which BNetzA decided that using the “average of the averages” would represent a “balanced approach”.¹
- It follows that **BNetzA's decision is not informed by the academic literature**, but rather its own precedent, and **reflects an arbitrary decision to try to achieve a “well-balanced estimation” by simply taking the mid-point of two different approaches**.
- Also, during the RP4 consultation process, the authors of the DMS yearbook, Dimson, Marsh and Staunton, have submitted a report criticising the BNetzA's methodology for determining the MRP, and namely the averaging method. **DMS argue in favour of using the arithmetic average instead of the midpoint between geometric and arithmetic average**. In their opinion, using the midpoint is arbitrary and “clearly incorrect”.²
- The BNetzA did not change its approach following the DMS report. However, experience from previous regulatory periods and the considerable reduction in the return on equity, suggest that appeals are very likely in the German context and that the outcome of those appeals often results in substantial changes to the allowed cost of capital and approaches initially determined by BNetzA. Hence, any successful appeal against BNetzA's averaging approach (also in light of the DMS report), would undermine ARERA's reference to the German precedent in support of its proposal.
- Finally, **ARERA appears to be cherry picking aspects of the German regulatory precedent on the cost of capital estimation that support its own proposals**, failing to considering the wider regulatory decision. For example, a coherent review of regulatory precedent from the recent German decision would support the use of a 10-year historical averaging period to compute the RF nominal.

Source: (1) NERA review and translation of BNetzA (2021), BK4-21-055, p. 17-19. (2) Dimson, Marsh, Staunton (2021), Assessment of BNetzA's/Frontier's position on a DMS-based MRP, Report for E.ON, p.14-16.

Conclusions and recommendations

- To conclude, we have identified several flaws and inconsistencies in ARERA's proposal to maintain a weighted average approach to calculate the TMR, which if not addressed may under-state the expected cost of equity over the regulatory period.
- ARERA's decision to adopt weights of 80% and 20% for the arithmetic and geometric average are arbitrary and do not appear to be based on empirical analysis or academic literature.
- Recent academic literature suggests that while there is debate in the financial literature about the appropriate averaging period for discounting vs. compounding, this debate is not relevant in the decision about the allowed cost of capital in a regulatory context .
- The objective of the regulator is to estimate the expected *annual* return which supports the use of a simple arithmetic average.
- **Hence, based on the above we recommend using the arithmetic mean only to compute the TMR for Italian network companies, in line with ARERA's own advisors, and therefore allowing a TMR of 6.6% for the II PWACC period.**

4 | Inflation

We welcome ARERA's change in the RF formula, but still identify flaws and inconsistencies in its approach to inflation across its proposals in DCO 488/21

In the following bullets, we summarise ARERA's approach and use of inflation across its proposals to estimate the real cost of capital parameters for energy networks at II PWACC:

- **RF:** ARERA proposes to use the 10-inflation linked swap rate (isr) to computing the real risk-free rate agreeing with respondents' views that all parameters should be estimated using a unique definition of inflation using a market-based measure which better reflects the forward looking value of inflation.¹
- **Cost of Debt:** ARERA proposes to use the ECB forecast for calculating the real cost of debt (ia) on grounds that, unlike for the cost of equity, the perspective is that of ensuring "cost coverage" rather than that of the investor. ARERA then argues "that the cost of debt companies incur in the regulatory period reflects the cost of debt from the debt portfolio and involves expenses that depend on the nominal rate levels". ARERA then concludes that "these costs, in terms of financial charges, are incurred during regulatory period and it is therefore correct that they are valued in real terms using the expected inflation rate as it allows the best estimate of the actual cost to be incurred during the regulatory period".²
- **CRP:** ARERA appears to contradict itself with regards to estimating the CRP by acknowledging that "the proposal to estimate the CRP in real terms is considered acceptable" but refusing to make any inflation adjustment since "from a European investor's perspective, the relevant inflation is that of the Eurozone".³

Despite the improvements in the RF formula, we identify several flaws and inconsistencies in ARERA's use of inflation in its proposals, namely:

1. Deflates the same parameters (e.g., UP and FP) using two different measures of inflation
2. Relies on flawed economic arguments to justify its use of the ECB forecast inflation for the cost of debt.
3. Provides contradictory statements regarding inflation in its CRP proposals.

We discuss each of these points in turn in the next slides.

By using the *isr* to estimate the real RFR, ARERA implicitly acknowledges that it is the best forward-looking value of inflation over the regulatory period


In DCO 488/21 ARERA changed its RF formula by adopting a unique measure of inflation across all parameters, choosing to adopt a market-based measure of inflation (*isr*). However, as noted in the previous slide, ARERA continues proposing to use the ECB forecast inflation for the cost of debt.

- ARERA's arguments to support the use of the ECB inflation in the **cost of debt** calculation is flawed since it does not provide support for the use of a specific measure of inflation, but rather, simply suggests that ARERA must identify an inflation measure that captures the *expected inflation rate* during the regulatory period that ensures cost recovery for debt holders.
- Conceptually, the same holds true when determining the **cost equity**: through its determination of an ex-ante cost of equity allowance, ARERA is trying to determine the expected real cost of equity required by investors over the regulatory period, and therefore the *expected inflation rate* to deflate nominal yields into real.
- As we noted in the previous slide, by adopting the *isr* measure of inflation to estimate the real risk-free rate, ARERA implicitly acknowledges that it is the best estimate of the *expected inflation rate* (or forward looking value of inflation) over the regulatory period.
- Failure to harmonise the definition of inflation across the cost of debt and equity parameters, is not only conceptually flawed but also results in ARERA deflating the same parameters (e.g., UP and FP) using two different measures of inflation.

It follows that, as we recommended in our September 2021 report, ARERA should adopt a consistent definition of expected inflation to calculate the cost of debt and equity based on a market-based measure of inflation, consistently with its revised approach to estimating the RF parameters.

From an investors' perspective investing in Italian network companies the relevant inflation is that used to index the Regulatory Asset Base (RAB)

The decision on the appropriate measure of inflation is determined by the inflation measure that is used to index the RAB and ensures consistency within the regulatory framework

- As we noted above, in DCO 488/21 ARERA appears to contradict itself with regards to estimating the CRP and more generally real cost of capital parameters:
 - By acknowledging that CRP should be estimated in *real* terms (i.e., therefore supporting an adjustment for differences in inflation to correctly estimate the real CRP);
 - But rejecting any inflation adjustment since “from a European investor's perspective, the relevant inflation is that of the Eurozone”.¹
- However, **from a European investors' perspective investing in an Italian network companies the relevant inflation is that used to index the RAB, i.e. Italian inflation (and not European inflation).**
- As we explain in our September 2021 report, given the consistent and substantial difference between Italian and European inflation of around ,² failure to adopt an Italian inflation measure in the cost of capital methodology will under-compensate investors in nominal terms.
- This is because by using a higher European inflation value to deflate the nominal cost of capital parameters for the cost of debt and equity, ARERA is “removing” a too high number (EU inflation) which is not compensated for in the nominal RAB because indexed to Italian inflation (i.e., lower).

The use of an Italian measure of inflation therefore ensures consistency within the wider regulatory framework for energy networks in Italy, and ensure investors / debt holders are adequately compensated in nominal terms through the revenue allowance formula.

Source: (1) NERA review and translation of ARERA, DCO 488/21, para. 7.39 (2) Estimated as difference between Italian and European inflation linked swap rates. See NERA's September 2021 report, slide 36.

Conclusions and recommendations

- To conclude our review of ARERA's proposal in DCO 488/21 suggests there are inconsistencies and flaws in ARERA's definition of expected inflation across its cost of debt and cost of equity proposals, which could result in a under-compensation of equity and debt investors in nominal terms.
- To address the shortcomings in its current proposal and ensure a robust and coherent regulatory framework, we recommend :
 1. Adopting a **market-based measure of inflation across all cost of capital parameters**;
 2. For the **cost of equity**, accounting for **Italian inflation** through the CRP by either A) including an inflation adjustment to calculate the real CRP, as recommended in our September 2021 report,¹ or B) apply directly the Fisher formula to the Italian and AAA-AA nominal government bond yields using the respective Italian and European inflation rates to obtain a real CRP estimate. We set out in formulae the two options below:

Option A)
Inflation adjustment
to the CRP:

$$\text{CRP} = \text{SPREAD} + \text{INF} + \text{FP}$$
$$\text{where INF} = \text{Inflation}_{IT} - \text{Inflation}_{AAA/AA}$$

Option B)
Fisher formula to
calculate the CRP:

$$\text{CRP} = \text{SPREAD} + \text{FP}$$
$$\text{where SPREAD} = \frac{\text{Bond Yield}_{IT} - \text{Inflation}_{IT}}{1 + \text{Inflation}_{IT}} - \frac{\text{Bond Yield}_{AAA/AA} - \text{Inflation}_{AAA/AA}}{1 + \text{Inflation}_{AAA/AA}}$$

3. For the **cost of debt**, adopt an **Italian** market-based measure of inflation (e.g., 10-year inflation-linked swaps for Italy or a measure that is consistent with the above cost of equity inputs for Italian inflation) to ensure debt holders in Italian network companies are adequately compensated in nominal terms through the revenue allowance formula.

5 | Beta

ARERA is considering increasing the asset beta for sectors with an allowed asset beta below 0.4 based on regulatory precedent

In the following bullets, we summarise ARERA's proposals to review the asset betas for energy networks at II PWACC:¹

- ARERA confirmed the methodological improvements set out in DCO 308/21 but is also considering reviewing the value of the asset beta as from 2022 based on “international evidence” and evidence received from stakeholders during the consultation process.
- We understand ARERA is considering an upwards beta adjustment only for those sectors that currently have an allowed asset beta below 0.4, that is the electricity transmission (0.35), electricity distribution and metering (0.39) and gas transport (0.364) sectors. Therefore under ARERA's proposals asset betas for the other sectors would remain unchanged.
- We understand that ARERA's proposal hinges on evidence from European regulatory precedent (namely Germany, Netherlands and Belgium) which seems to suggest that allowed asset betas are around 0.4.
- ARERA acknowledges that differences in systematic risk across the gas and electricity sectors, also within the wider context of the energy transition, depend on relative differences in the legal and regulatory framework across sectors. ARERA plans to assess those as part of the sector-specific tariff review processes.

Whilst we welcome ARERA's proposal to review asset betas as part of the II PWACC review process, we identify some flaws in the methodological approach proposed by ARERA, namely:

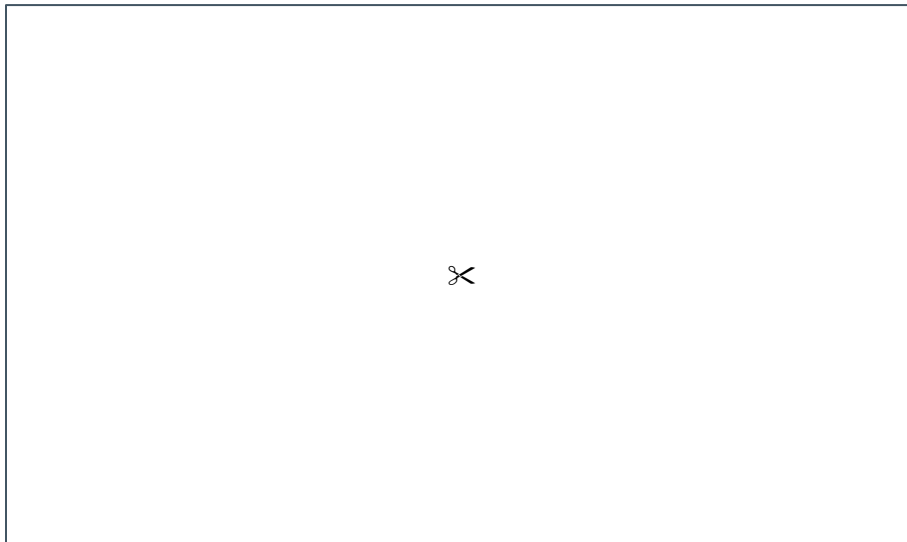
- It hinges on regulatory precedent and fails to assess empirical evidence or relative risk across countries and regulatory regimes, undermining its own approach to estimating betas at past reviews; and
- Results in an alignment of some of asset betas across sectors, and reduction in asset beta differences relative to the other sectors, without appraising the relative systematic risk across sectors in Italy and therefore contracting with its own statement above.

We further develop the above arguments in turn in the next slides.

Source: NERA review and translation of (1) ARERA, DCO 488/21, para.7.47-7.55.

Asset betas for Italian companies have been consistently higher than those of European peers, suggesting a higher systematic risk

Figure: 2Y rolling asset beta for a sample of Italian and European energy network companies (2010-2021)



- Over the last decade Italian network companies' asset betas have remained persistently higher than asset betas for European network companies, with the gap widening gradually over time, as illustrated in the figure.
- This difference suggests that **Italian networks are subject to higher levels of systematic risk than non-Italian networks**, and therefore require higher asset beta allowances to compensate for this additional risk.

Hence, ARERA's proposal to review only asset betas for sectors that currently have an allowed beta below a threshold of 0.4 defined **solely** on the basis of European regulatory precedent may under-state the true systematic risk faced by Italian network companies, and therefore the cost of equity required by investors in Italian network companies.

Note: Cut-off: Sep-21. Adjusted betas, using daily values and Eurostoxx 600 for EU companies and FTSE 100 for UK. Non-Italian sample includes: National Grid, Red Electrica, Enagas, Elia, REN and Naturgy. Italian sample includes: Snam, Terna, Italgas, Hera, Iren and Ascopiave. Source: NERA analysis of financial market data

Empirical evidence shows that systematic risk has been increasing since the height of the financial crisis across all sectors

Figure: 2Y Rolling average asset betas across European electricity and gas network companies (Cut-off: 30 Sep 21)

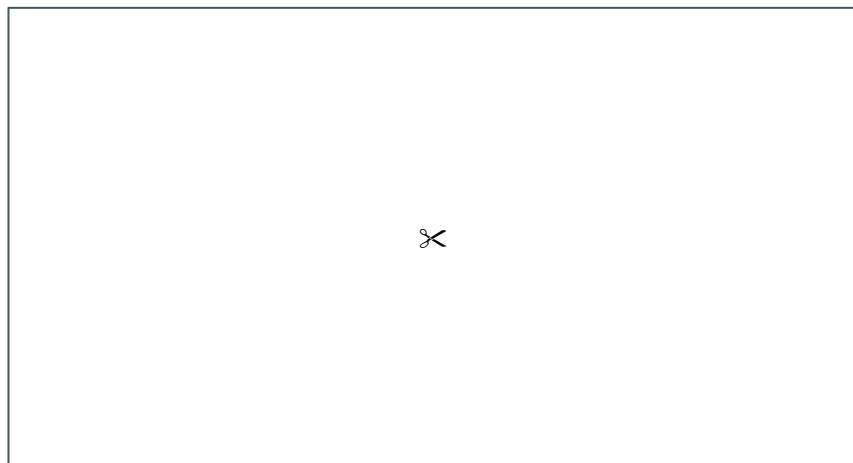


Table: Empirical asset betas for European energy network companies (Cut-off 30 Sep 2021)

Cut off: 30 Sep 2021	
2Y Asset Beta	
3Y Asset Beta	
4Y Asset Beta	
5Y Asset Beta	

- Our analysis of the average electricity and gas network asset beta across Europe suggests that asset betas have risen since 2010 across all sectors, as illustrated in the Figure above.
- Despite this evidence, as noted in our September 2021 report, asset betas across most regulated sectors have not changed over the last decade.
- Also, as the Table shows, empirical asset betas across Europe are markedly above most allowed asset betas by ARERA.

It follows that failure to update all asset betas across sectors, may not adequately compensate equity investors for the risks associated with investing in Italian regulated energy companies.

Note: Cut-off: Sep-21. Adjusted betas, using daily values and Eurostoxx 600 for EU companies and FTSE 100 for UK. Comparator sample includes: National Grid, Red Electrica, Enagas, Elia, REN, Naturgy, Snam, Terna, Italgas, Hera, Iren and Ascopiave. Source: NERA analysis of financial market data.

Conclusions and recommendations

To conclude, whilst we welcome ARERA's proposal to review asset betas as part of the II PWACC review process, we identify some flaws in the methodological approach proposed by ARERA, namely:

- 1. It hinges on regulatory precedent and fails to assess empirical evidence or relative risk across countries and regulatory regimes, undermining its own approach to estimating betas at past reviews;**
 - Our own analysis suggests that asset betas for Italian companies have been consistently higher than those of European peers suggesting that investors perceive a higher systematic risk with Italian firms and undermining ARERA's choice of reviewing asset betas solely on the basis of European regulatory precedent.
 - Equally, our own analysis suggests that asset betas have been increasing across *all* sectors over the past decade and that ARERA's threshold may result in an arbitrary decision to update betas only for certain sectors.
 - 2. Results in an alignment of some of asset betas across sectors, and reduction in asset beta differences relative to the other sectors, without appraising the relative systematic risk across sectors in Italy.** This contradicts with its own statement that the regulatory and legal frameworks, as well as the energy transition, may impact systematic risk across sectors as well as with best financial and regulatory practice in beta estimation.
- It follows that to ensure equity investors across all sectors are adequately compensated for their risk, we recommend :
- 1. Updating the asset betas for all regulated sectors to reflect the increase in asset betas since the last reviews.**
 - 2. To avoid sector-specific reviews and analysis of relative risk, which falls within the scope of the tariff review processes, we recommend ARERA to increase all asset betas on a pro-rated basis to reflect overall sample increase in asset betas.**

6 | Other Observations

We generally agree with the proposed approach to estimating the CP, but identify a methodological flaw in its estimation by Oxera

ARERA's proposals regarding the value of the Convenience Premium (CP) under DCO 308/21 and DCO 488/21:

- In DCO 308/21, **ARERA indicated a preliminary CP value of 1%**, by taking the top end of the range calculated by Oxera of 0.6% - 1.00% based on the 1Y average spread of AAA-rated corporate bonds to AA-AAA rated government bonds estimated between 2014 and 2021.¹
- In DCO 488/21, ARERA does not explicitly suggest a value for the CP but notes that it may **range between 0.5% and 1%**.²
- In DCO 488/21, ARERA also notes that the CP parameter has been established on the basis of “long run evidence” and therefore would not be adjusted during the regulatory period.³

We generally agree with the proposed approach to estimating the CP, but note the following:

- While ARERA correctly proposes to add a CP to the risk-free rate, it does not propose adding a similar premium to the CRP.
- ARERA's consultants (Oxera) fails to consider AA-corporate bonds when calculating the spread over AAA and AA government bond yield.
- Our analysis of the CP calculated using both AA and AAA corporate bonds shows that the 1Y average spread between AAA-AA corporate and govt bond yields over the last 10 years (Aug-2011 to Aug-2021) is closer to the upper end of the range suggested by ARERA in DCO 488/21, i.e. 1%.⁴
- ARERA's estimate of the CP should reflect a “long-term” estimate of the CP and that the parameter will remain constant over the entire PWACC II period.

Given that the parameter will remain constant for a period 6 years, and that the ex-ante CP may deviate from the actual CP over the regulatory period, we recommend adopting the upper end value of the range in line with approaches taken by other regulators to avoid the detrimental long-term impact of setting a WACC that is too low on investments.

ARERA's approach to estimating the Uncertainty Premium (UP) is opaque and does not allow detailed scrutiny of the suggested ranges (1/2)

ARERA's proposals regarding the value of the Uncertainty Premium (CP) under DCO 308/21 and DCO 488/21:

- In DCO 308/21, **ARERA does not provide a view on the value of the UP**, but we note that Oxera assumes a value of 25-50bps based on data from regulatory determinations.¹
- In DCO 488/21, **ARERA suggests a range 25-50 bps for the UP based on regulatory precedent.**²
- In DCO 488/21, ARERA proposes to maintain the value of the UP fixed over the regulator period.³

Whilst we welcome the inclusion of an UP for the II PWACC period to shield investors from the risk that spot rates may rise faster than forward rates, we identify some flaws in ARERA's proposals:

1. ARERA's range is based solely on (undisclosed) regulatory precedent.
2. ARERA's range may under-state the risk associated with BBB-instruments and other risk factors not accounted for in the cost of capital formula.

We further develop the above arguments in the next slide.

ARERA's approach to estimating the Uncertainty Premium (UP) is opaque and does not allow detailed scrutiny of the suggested ranges (2/2)

We welcome the inclusion of an UP for the II PWACC period to shield investors from the risk that spot rates may rise faster than forward rates, but we identify the following flaws in ARERA's proposals:

- ARERA's suggested range is based solely on (undisclosed) regulatory precedent collected by Oxera, which makes it hard to adequately scrutinise and review as part of the consultation process.
- If ARERA relies on regulatory precedent, then it should rely on the regulatory precedent within Italy from its own decisions which have effectively allowed a floor (or uncertainty premium) of 0.5 per cent real over the last six years.
- As explained in our September 2021 report:⁴
 - Oxera's suggested UP range of 0.25% - 0.50% could be based on uncertainty around AAA-AA govt bond yields and would therefore be under-estimating the required UP in the cost of equity and cost of debt allowances due to the higher risk and volatility associated with BBB and Italian bonds. Whilst ARERA correctly proposes to add a FP to the CRP, it does not include a UP component in the CRP.
 - ARERA's current cost of capital formula does not shield investors from potential volatility in market-based inflation rates (e.g., used to deflate government bond yields) therefore exposing investors to inflation risk.
- Overall, since market expectations of future yields are particularly volatile (especially if estimated over short periods of time) ARERA's estimate of the FP may not be a reliable estimate of the "true" premium. Though the direction of the bias may be upwards or downwards, regulatory authorities in the UK and elsewhere acknowledge that the consequences over time of under-estimating the WACC might be greater due to the detrimental long-term impact of under-investment (resulting from a lower allowed WACC).

Given the regulatory precedent in Italy of a 0.5% real floor and the fact that ARERA's range may under-state the risk associated with BBB-instruments and other risk factors not accounted for in the cost of capital formula, we recommend ARERA takes **at least the upper end of the suggested UP range, to avoid the potential detrimental effects on investments from setting a cost of capital that is too low.**

Source: (1) See NERA's September 2021 report, slide 26 and slide 34.

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