



The future of gas infrastructure remuneration in Spain

1. Introduction

The European Union (EU) has adopted ambitious decarbonization targets that imply a significant decline in the use of fossil fuels. Meeting these targets will require deep penetration of renewable electricity and progressive electrification of key end markets, namely transport, heating, and industry. But electricity will not take us all the way. The transition in the EU will also require decarbonized gas – such as renewable hydrogen and biomethane. For instance, in some countries, decarbonized gas may support a decarbonization of industries or of domestic heating that is otherwise not economic to electrify, and could also form the basis of power-to-gas conversions for large-scale storage of the energy captured by intermittent wind and solar sources of electricity. Natural gas will also play an important role in decarbonization, by replacing coal in the power sector and oil products in transport and heating, and by providing backup to renewable electricity. However, to meet EU decarbonization targets, natural gas demand will decline, since both CO₂ from combustion and unburned methane from leaks are significant greenhouse gases.

This is the situation facing Spain, which has submitted to the European Commission a draft energy and climate change plan (PNIEC¹) requiring investment of about €236 billion between 2021 and 2030, approximately 80 per cent of which is expected to come from the private sector. Electricity is the central driver of decarbonization and receives most of the planned investment. The plan forecasts that natural gas consumption will begin to decline by 2030 but it also highlights a goal of replacing some of this decline by integrating renewable gases in the medium to long term. By comparison to some other large EU countries, Spain has not made a fast start in relation to the development of renewable hydrogen (electrolysis), biomethane, or other methane projects.²

The investment requirements to meet the energy transition objectives are significant. The regulatory framework for remunerating energy infrastructures³ is key to attracting *new* investment in these infrastructures and in the services and products that use them. It is also important for remunerating *existing* infrastructure assets properly; failure to do so would send a chilling message to future investors and could affect the incentives of existing owners to maintain and develop the assets they own. In addition, regulation of infrastructure has now to recognize that gas and electricity are converging technologies: they compete in final energy markets – heating, for example – and could also be part of an integrated power-to-gas energy system. For these reasons, it is important to develop a regulatory framework for gas and electricity infrastructure that supports effective competition in energy end markets as well as gas–electricity integration where that makes economic sense.

¹ PNIEC is the Spanish acronym for the *Plan Nacional Integrado de Energía y Clima*. A new version will be published soon, taking account of the many comments received on the first draft.

² See: Bioenergy Europe, Statistical Report 2019, Tables 1 and 2, and Figure 5; and Lambert and Oluleye (forthcoming).

³ We use the terms 'infrastructure' and 'network' interchangeably in the paper.

It is within this context that we examine proposals, recently issued by Spain's National Commission for Competition and Markets (CNMC in its Spanish acronym⁴), to change the methodology for remunerating gas distribution and transmission networks, and LNG regasification terminals, and to move towards a common methodology for the remuneration of electricity and gas infrastructure. This is the first time the CNMC has had the authority to determine remuneration for these regulated activities; previously governments took these decisions. Investors are naturally interested in the CNMC's decisions, especially since Spain has a reputation for surprising investors in regulated energy assets to the downside, most notably with reductions to remuneration for renewable electricity and electricity networks in 2013-2014. (Keay and Robinson, 2017)

The CNMC proposals, if adopted, would involve a substantial reduction in the remuneration of all electricity⁵ and gas infrastructure activities. For gas, which is the focus here, the CNMC is proposing to reduce remuneration for distribution (-18 per cent), transmission (-26 per cent), and regasification (-14 per cent) over the period 2021-26. The reductions are much greater if one compares the projected revenues at the end of the regulatory period under the current system with the proposed system.

In response, financial markets substantially reduced the market capitalization of the leading Spanish electricity and gas companies, suggesting that they had been surprised by the CNMC proposals. Affected companies and investors argue that the changes are not justified and will have unforeseen and negative consequences for both the sustainability of the Spanish energy sector and of Spain as an investment destination.⁶ Meanwhile, consumer groups have welcomed the proposals. The Ministry of Ecological Transition (hereafter the Ministry) has indicated its general support for the proposals for gas, although with reservations.⁷

This note has four sections in addition to this introduction. Section 2 explains and analyses the timing and the CNMC's justification for their proposals related to gas distribution, gas transmission, and regasification. Section 3 examines key features of the proposals. Section 4 offers our general reflections, and the final section concludes with our recommendations.

A few caveats are in order. First, the CNMC proposals on remuneration methodology for gas infrastructure are long and complex. We do not examine the details of the proposals but rather highlight issues that are especially relevant to energy decarbonization. Second, we have insufficient information to take a firm position with respect to the justification for the CNMC's proposed reforms and some of our views are therefore preliminary. Third, we are examining only the remuneration methodology that applies to regulated gas infrastructure assets, not the remuneration of the products that may use these assets, such as natural gas, hydrogen, or biomethane.

2. The timing and the rationale for the CNMC's proposals

Timing

In January 2019, the Spanish government passed legislation⁸ that handed responsibility for setting regulated electricity and gas network tariffs to an existing independent regulatory authority, the CNMC. Previously, Spanish governments had regulated network tariffs directly, contrary to European legislation which generally requires independent regulatory determination of these tariffs.

⁴ *Comisión Nacional de los Mercados y la Competencia*. In References, see CNMC 2019a (covering transmission and regasification) and CNMC 2019b (covering distribution) for justifications and explanations of the proposals for remuneration methodologies relating to these regulated activities.

⁵ It is worth noting that in 2014, the government adopted a new remuneration methodology, along with a sharp reduction in revenues, for electricity networks. The recent CNMC proposals for electricity again introduce very sharp reductions in electricity network revenues.

⁶ Ian Mount and David Sheppard, 'Investors warn against Spanish plan to cut utility returns', *Financial Times*, 1 August 2019. <https://www.ft.com/content/68058ce2-b393-11e9-bec9-fdcab53d6959>.

⁷ See Ministry 2019a and Ministry 2019b in References.

⁸ 'The new powers of the National Commission on Markets and Competition regarding energy', 21 February 2019, Osborne Clarke. <https://www.osborneclarke.com/insights/new-powers-national-commission-markets-competition-regarding-energy/>.

In line with the new legislation, the CNMC issued a number of proposals in June and July; these included proposals on the remuneration methodology for regulated gas and electricity networks. Following a period of consultation, the CNMC must finalize the regulations to enter into force on 1 January 2020. Our analysis concentrates on proposals to determine the methodology for remunerating the following regulated activities: (a) gas distribution and (b) gas transmission and LNG regasification.

Although gas network regulations must enter into force on 1 January 2020, the six-year regulatory period to which they apply begins on 1 January 2021. By contrast, a parallel set of regulations for electricity networks applies to a six-year regulatory period that begins on 1 January 2020.

Rationale

The CNMC argues that the current remuneration methodologies overcompensate regulated distribution, transmission, and regasification services (CNMC 2019a and CNMC 2019b). They begin their analysis by reporting evidence of high and rising gas prices and access tariffs in Spain by comparison to other European countries. They also provide selected evidence to support their view that investor returns on equity (ROE) in the gas sector are high both by European standards and by comparison to other sectors (including electricity) in Spain.

We have not analysed these comparisons in detail, but have some concerns about the CNMC analysis, based on comparative data we have seen and on the explanations provided for the differences. First, the methodology of international comparisons requires great care to ensure that like is compared with like, in particular with respect to customer categories, timeframes of the prices reported, and the countries and companies with which comparisons are made. Second, prices and network costs in Spain are at least partly due to policy decisions. For instance, the policy to diversify gas supplies away from Algeria led to the building of LNG regasification terminals and to higher costs of gas relative to countries reliant on pipeline gas from Russia. Furthermore, the increase of regasification and gas transmission capacity and costs was, at least partly, a response to previous government plans that foresaw a significant expansion in gas-fired electricity generation. This gas infrastructure capacity has been underutilized for years, partly because of the economic crisis, but also because of government decisions to promote the penetration of renewable electricity, which replaced gas-fired generation. Third, when one reports the ROE, it is not enough to do so for a few years; the analysis has to be for each company over the full life of specific assets and it is important to know whether high returns later in an asset's life compensate lower returns earlier on.

3. What changes explain the lower proposed remuneration?

A few proposed changes explain most of the reduced remuneration for gas infrastructure.⁹ One applies to distribution networks and the other to transmission networks and regasification terminals.

Gas distribution (low pressure network)

For gas distribution, the CNMC proposes to change the model of remuneration for *existing assets*, while introducing a variation of the existing remuneration model for *new assets* entering into service after 1 January 2021. The CNMC is therefore proposing a hybrid approach which differentiates between existing and new assets.

⁹ There are many other proposals not addressed in this note including, *inter alia*, the determination of the cost of finance, a change in the definition of the gas year, and treatment of connected services (which are not regulated but use regulated assets). For distribution, there are proposed changes in the remuneration for asset life extension and improvements in Operation and Maintenance, and in the treatment of retired assets and assets that have been transferred to new owners. For transmission and regasification, changes include, *inter alia*, a different approach to amortization, which substantially reduces remuneration.

Existing assets. Since 2002, albeit with modifications, the existing model remunerates distribution networks primarily on the basis of two parameters: number of clients and the gas volume throughput.¹⁰ Apparently, this parametric model aimed to avoid investment in distribution networks with limited volumes and consumers. It passed to the distribution companies the demand risk associated with new investment decisions and thereby provided incentives to encourage capacity expansion only where and when the reimbursements for volume and clients were greater than the incremental costs. This is a model with some good incentive properties, but it is sensitive to the choice of parameters.

Now, however, the CNMC proposes to adopt a new methodology for remunerating the companies by reference to their regulatory asset base (RAB). This methodology would pay an 'ordinary' remuneration based on company financial statements, with three payment concepts: (a) depreciation expense, (b) a financial return (WACC)¹¹ on the net value of the RAB after depreciation, and (c) a remuneration for operation and maintenance (O&M) expenses. In addition, the proposal includes incentives for life extension for existing assets and O&M efficiency improvements.

The CNMC argues that the current clients and volume (parametric) methodology overcompensates the distribution companies. As mentioned earlier, they maintain that recent gas prices and gas network access tariffs are high by European standards, especially for residential consumers. They also note that, even with these tariffs, regulated revenues have been insufficient to cover the remuneration entitlements of the distribution companies, leading to a cumulative tariff 'deficit' of about €1 billion to be recovered from future customers.¹² To support their case for a change in methodology, the CNMC provides evidence of returns on equity (ROE) and returns on investment (ROI) for Spanish gas distribution companies in 2013–2015. Although they report a very wide dispersion of results for different companies (for instance, in 2015, ROEs ranging from 21.49 per cent to 1.04 per cent) and do not report financial results for earlier or later years, they conclude that the returns to investors are too high for an activity considered to be of low risk. As mentioned above, it is very difficult to draw a firm conclusion about whether investors have been overpaid without detailed information on the returns over the full life of the assets and on the risks they took. In particular, it is important to ascertain whether assets earned low returns early in their lives, since this might justify higher returns later. Furthermore, this financial analysis would need to look at specific companies and assets.

The CNMC uses an analysis of what past reimbursements would have been using their proposed new methodology to confirm their view that the distribution companies have been overcompensated. They conclude that the 'excess' should be eliminated over the upcoming six-year regulatory period. As shown in Table 1, assuming no growth in the number of clients or throughput volumes, their analysis results in an estimated reduction in remuneration for distribution companies, from €1418 million in 2021 to an annual average of €1165 million over the regulatory period, a decline of 18 per cent. Comparing revenues at the end of the period under the two methodologies, the reduction is much greater, from €1420 million to €967 million (32 per cent).

¹⁰ The history can be broken into three periods. Investments in distribution before 2002 were assigned a regulatory value that was used to determine their remuneration. Remuneration for investments in gas distribution between 2002 and 2014 was not a function of investment, but rather of market penetration (clients and sales) following a formula. Since 2014, remuneration has still been based on market penetration, but with a new formula. In addition, regulation provided an additional incentive to extend natural gas penetration into new municipalities. Note that the CNMC concludes that all assets built before 2002 are now fully amortized, a conclusion that may well be challenged.

¹¹ The Weighted Average Cost of Capital (WACC) is the rate that a company is expected to have to pay on average to all its debt and equity security holders to finance its assets. It is commonly referred to as a firm's cost of capital.

¹² To the extent that lower recognized network costs are used to reduce the accumulated tariff deficit, the main beneficiaries will be future consumers. The immediate reduction to current tariffs will be less than might be suggested by the decline in recognized costs.

Table 1: CNMC estimated forecast remuneration 2021–26 for gas distribution in Spain under Current Methodology and CNMC Proposed Methodology

from Jan to Dec of year <i>n</i>				from Oct of year <i>n</i> –1 to Sept of year <i>n</i>						Average Remuneration
Million €	2018	2019	2020	2021	2022	2023	2024	2025	2026	2021–26
Current methodology	1,426	1,420	1,420	1,420	1,420	1,420	1,420	1,420	1,420	1,420
Proposed methodology				1,418	1,324	1,210	1,096	983	967	1,165
Impact compared to Current Methodology				–2	–96	–210	–324	–437	–452	–255

Source: CNMC 2019b

The change to an RAB methodology for existing assets is offset in 2021, the first year of the new regulatory period, by substantial so-called productivity and efficiency adjustments (ARPE in Table 2) totalling €365 million. However, these adjustments decline by two-thirds over the rest of the regulatory period, to only €116 million in 2026, so total projected reimbursements under the new regime decline, as mentioned above, by 32 per cent. The ARPE includes estimated remuneration for life extension of assets (REJU) and improved O&M efficiency (RMP). However, the key is the third element (RTD)¹³, which represents part of the CNMC’s estimate of the ‘excess’ revenue related to the current methodology. The RTD is the so-called ‘transitory’ remuneration, which falls from €293 million (60 per cent of their estimated ‘excess’) in 2021 to €0 in 2025.

Although the CNMC proposal smooths the decline in remuneration with the ARPE adjustments, the magnitude and the speed of the decrease explain complaints by companies and their investors that the CNMC is proposing to take away distribution company entitlements – consequently raising investor perceptions of the risk associated with any future investments regulated by the CNMC. In order to address this concern, the CNMC should provide sufficient information about returns over the life of the assets, to be able to confirm that investors have been (and will be) adequately rewarded to reflect the costs and the risks they incurred under the previous regime.

New assets Our understanding is that the CNMC proposes not to use the RAB methodology to remunerate assets that enter into service after 1 January 2021. This remuneration is reflected in Table 2 as Market Development Remuneration, with revenues of €8 million in 2021 followed by €0 for the remainder of the period. Presumably the CNMC foresees virtually no new market development in distribution during this regulatory period. However, if new investments are approved during the period or later, they would be remunerated on the basis of a revised version of the parametric model that the CNMC is abandoning for existing assets. The explanation is that the regulator wants companies to bear the demand-side risk of new investments. Although the parametric model has its attractions, it seems strange that the CNMC wishes to replace this model for existing assets and to continue using it for new ones. Presumably investors would be concerned that the regulator would change the model later to reduce the upside if it were to appear. Furthermore, the parametric model may not attract potential investors in high-risk network investments to transport currently uneconomic renewable gas, for which demand would be very uncertain.

¹³ RTD is the acronym in Spanish for the Transitory Remuneration of Distribution.

Table 2: Breakdown of the CNMC forecast remuneration for distribution under their proposed Methodology 2021–26

Million €	From Oct of year n–1 to Sept of year n						Average Remuneration
	2021	2022	2023	2024	2025	2026	2021–26
Ordinary Remuneration Distribution	1,045	931	910	890	871	852	917
Market Development Remuneration	8	0	0	0	0	0	0
Productivity and Efficiency Remuneration Adjustment (ARPE)	365	393	299	205	112	116	248
RTD	293	293	195	98	0		176
REUV	29	42	46	50	54	58	46
RMP	43	58	58	58	58	58	55
Impact on the Current Methodology	1,418	1,324	1,210	1,096	983	967	1,165

Source: CNMC 2019b

Transmission and regasification

The fall in remuneration for transmission and regasification has a different explanation. These assets are already being remunerated mainly on the basis of their RAB. However, since 2014, the owners have also been receiving an additional element of compensation (RCS) based on the volume moving through the network.¹⁴ We do not fully understand the reasons for introducing the RCS. According to text quoted by the CNMC, the then Government introduced the RCS to adjust costs to changes in demand and to pass the risk of changes in demand to the owners of the assets. Our understanding is, therefore, that the aim of this change was to discourage additional investment and, instead, to encourage owners to increase their revenue by increasing throughput, which would eventually lower unit costs. However, the CNMC sees no consumer benefit from continuing this extra payment and considers that the RCS increases investor returns above what is appropriate for a low-risk business. They offer evidence of earned returns on equity above 14 per cent, due in part to the existence of the additional volumetric source of remuneration, and higher than the ROE implicit in the allowed WACC. They conclude that there is no reason to continue the additional compensation and that it should be phased out progressively during the next regulatory period.

As Tables 3 and 4 reflect, the CNMC proposals lead to a forecast decline in average annual remuneration over the six-year regulatory period of 25.6 per cent for transmission and of 13.8 per cent for regasification. The impact of the overall reduction in remuneration is much greater when comparing the revenues under the two scenarios in 2026: 35.8 per cent for transmission and 21.9 per cent for regasification.

¹⁴ This is called the *Retribución por Continuidad de Suministro* (RCS), or compensation for continuation (or security) of supply.

Table 3: CNMC estimated forecast remuneration 2021–26 for gas transmission in Spain under Current Methodology and CNMC Proposed Methodology

from Jan to Dec of year <i>n</i>				from Oct of year <i>n</i> –1 to Sept of year <i>n</i>						Average Remuneration
Million €	2018	2019	2020	2021	2022	2023	2024	2025	2026	2021–26
Current Methodology	840	823	805	788	772	756	740	721	704	747
Proposed Methodology				707	624	571	519	462	452	556
Impact compared to Current Methodology				–81	–148	–184	–221	–259	–252	–191

Source: CNMC 2019a

Table 4: CNMC estimated forecast remuneration 2021–26 for regasification in Spain under Current Methodology and CNMC Proposed Methodology

from Jan to Dec of year <i>n</i>				from Oct of year <i>n</i> –1 to Sept of year <i>n</i>						Average Remuneration
Million €	2018	2019	2020	2021	2022	2023	2024	2025	2026	2021–26
Current Methodology	403	391	381	376	370	363	352	343	333	356
Proposed Methodology				359	335	317	295	274	260	307
Impact compared to Current Methodology				–17	–35	–46	–57	–69	–73	–49

Source: CNMC 2019a

The CNMC has smoothed the decline in remuneration for transmission and regasification. The 2021 remuneration includes a substantial productivity and efficiency remuneration (ARPE), which corresponds almost entirely to the RCS payment. Specifically, in 2021, the forecast ARPE remuneration for transmission is €203 million, including €191 million for the RCS; by 2025, the ARPE has fallen to €17 million, with €0 for the RCS. For regasification, ARPE in 2021 is €69 million, including €56 million for RCS; by 2025, ARPE has fallen to €22 million and RCS to €0.

The magnitude and the speed of the proposed decline in future remuneration for transmission and regasification explain the reaction of affected companies and their investors. We have not analysed the economic case for eliminating the additional volume-related remuneration. In any case, the CNMC should provide evidence to demonstrate that, even with the proposed changes, owners should earn a fair return over the life of the assets. The CNMC should also demonstrate that future income will be sufficient to fund any investments needed to accommodate any increase in natural gas volumes – especially given the evidence of early closure of coal-fired generation stations and the planned closure of nuclear power stations – and to ensure that the companies are in a position to transport renewable gas at a later date if necessary.

4. Reflections on the CNMC’s proposals

Choosing a common regulatory methodology, especially for new assets

We think it makes sense to adopt a common RAB approach to remunerating both gas and electricity networks, especially for new investment. First, most investors are familiar with the general RAB methodology and are likely to welcome that approach if they are convinced it will provide them with greater predictability and a reasonable return on investment. Second, since electricity and gas are converging technologies – in the sense that they compete increasingly in final markets and may also be part of an integrated power-to-gas energy system – it makes sense that their networks face the same regulatory methodology. Third, RAB methodology has the potential to be a suitable regulatory methodology for future investments in higher-risk networks, in particular for hydrogen, which is currently

not economic. Fourth, the adoption of RAB methodology enables the CNMC to draw on the experience of many other regulatory systems, especially in the USA which has extensive experience in implementing this methodology.

We would add two caveats on RAB methodology. First, the devil is in the details. In particular, if regulators allow ill-advised investments and apply the RAB methodology, then gas consumers will bear the consequences, especially if some of the investments are stimulated by an allowed WACC higher than the real cost of capital. On the other hand, if the regulator understates the RAB or the WACC, economic investment may not occur and consumers may continue to use more polluting fuels. In short, the RAB methodology *per se* is not the solution; its correct implementation is key.

Second, the CNMC's proposal to adopt a hybrid methodology for distribution seems ill-advised. If the CNMC has decided to replace the current parametric methodology with an RAB methodology for existing assets, surely it makes sense to adopt an RAB methodology for new investments as well. This may seem irrelevant if no new investment is expected. However, if new network investment is required, it would be understandable if investors were wary of trusting a methodology that the CNMC is proposing to replace for existing distribution assets, especially if the investment involved moving uneconomic gas that faced very uncertain demand growth.

Reducing future entitlements for existing assets

The decision to reduce remuneration for all existing gas infrastructure assets inevitably raises concerns for investors, especially given the troubling tradition of Spanish regulation. Investors may not have been entirely surprised by the direction of the CNMC's proposal, since the organization had previously signalled, before it had any authority to make decisions, its concerns about remuneration in published documents. However, the size and the speed of the reduction were probably not expected and do require well-argued justification. We have not had the opportunity to assess the data sufficiently to know whether the case for reducing remuneration to the extent proposed is justified. If they are to attenuate investor concerns, the CNMC must demonstrate convincingly that investors have been (or will be) properly remunerated over the full life of the specific assets they have financed, bearing in mind that later higher returns may appropriately compensate for lower returns earlier on. We would also expect the CNMC to take great care to ensure that it provides an accurate international comparison of gas prices, access charges and returns and a full explanation of the reasons for these differences.

The CNMC decision for distribution assets is especially challenging. Even though an RAB regulatory system is a logical framework for remunerating future investment, it is worth considering that past investment in the distribution companies that would be subject to the CNMC's new regulatory regime was undertaken under a different regime. Given the long-lived nature of the investments and the risks taken by investors, it was arguably a legitimate expectation that the regime would not fundamentally change. The Ministry recognizes the potential problem. In its comments on the CNMC's proposals for distribution, the Ministry notes that investment decisions after 2002 were taken under what was, fundamentally, the same regulatory regime that still applies today (with modifications); remuneration was based on the number of connected customers and the volume of throughput. That meant returns would be back-ended because investments often have to be made considerably in advance of their full utilization. Investors would therefore bear the risk associated with demand; success in raising demand would be rewarded and failure punished. But the proposed RAB regulation essentially front-ends remuneration, since prices under that system are based on the cost of the original asset and there is no significant demand risk. By changing the regulatory model well into the life of the assets built under the existing regime, it could be argued that the CNMC is essentially taking away the back-end benefits that accrue to companies and investors who have been willing to assume the demand-side risks. To refute that argument, the CNMC would need to provide plausible evidence and analysis supporting their claim that returns on past investments have been too high and that regulatory commitments made in the past should be retracted. The CNMC recognizes the need for a transition. However, the challenge is to ensure that their final regulation is robust and adequately reflects the legitimate concerns of investors, as well as the long-term interests of consumers.

Decarbonization: the role of natural gas and renewable gas

The Ministry gave the following guidance to the CNMC: the methodology for the remuneration of distribution should promote the use of less-polluting fuels and the injection of renewable gas into distribution networks.¹⁵ This guidance reflects Spain's draft plan to convert the country into a carbon-neutral country by 2050. Although the plan foresees a decline in the use of natural gas,¹⁶ it recognizes that the latter will play an important role in the decarbonization process, especially until 2030. It will do so by replacing more-polluting fuels (oil products in heating and industry, and coal in the power sector) and by providing backup for an increasing volume of intermittent renewables. The PNIEC and the Ministry's guidance also suggest that natural gas networks will play a role in the penetration of renewable gas.

Natural gas

The CNMC's final decisions on remuneration should recognize the role played by natural gas in the energy transition, especially over the regulatory period in question. We have not assessed the implications of the reduction in revenues for gas infrastructure companies, but would encourage the CNMC to ensure that revenues are sufficient to support adequate operating and maintenance expenses as well as supply security, allowing for the possibility of an increase in final gas demand, especially in the light of the early closure of Spain's coal-fired stations and the planned closure of nuclear stations.

The penetration of renewable gas will, most likely, coincide with reduced consumption of natural gas. The decline in natural gas consumption will lower the utilization of certain assets, notably regasification plants, raising the unit costs of natural gas. The question is: should final gas consumers pay for the higher costs of gas resulting from lower throughput of natural gas, which is itself a response to the national policy of decarbonization? A further question is how best to deal with the declining value of the networks, in other words potentially stranded assets¹⁷: should they be subject to accelerated depreciation, be left on the books until they eventually depreciate, or be treated in some other way? The CNMC and the Ministry need to consider these questions together, since some of the potentially stranded assets may be recovered through the public budget.

Renewable gas

The PNIEC refers to the promotion, over the medium to long term, of renewable gases, especially biomethane and renewable hydrogen, through electrolysis¹⁸. It recognizes the potential for renewable gases to be integrated into existing natural gas networks and for an integration of the electricity and gas networks to enable power-to-gas (such as hydrogen) conversions and large-scale storage of the energy inherent in hydrogen gas. It also recognizes the potential for renewable gas to decarbonize transport and industry. The PNIEC supports the penetration of renewable gases through plans to (a) determine their potential production (theoretical, technical, and economic), (b) define a strategy for the most efficient uses and sourcing of these gases, and (c) design support mechanisms to exploit renewable gases, including the possibility of their injection into natural gas networks.

It could be argued that countries like Spain, with significant wind, solar and hydro renewables resources, well developed electricity networks, and a temperate climate do not require much renewable gas. Furthermore, in Spain, biomethane is produced in smaller quantities than in other EU countries and at present is generally not economic. Hydrogen is also very expensive in comparison to natural gas.

¹⁵ 'Deber promover el uso de combustibles menos contaminantes y la inyección de gases de origen renovable en las redes de distribución.' Ministry 2019a, page 5.

¹⁶ This decline in demand for gas is partly due to a reduction in total final energy demand resulting from assumed efficiency improvements. The share of gas in total energy demand increases between 2015 and 2030.

¹⁷ Stranded assets are those investments which have already been made but which, at some time prior to the end of their economic life (as assumed at the investment decision point), are no longer able to earn an economic return.

¹⁸ The PNIEC is consistent with the Government's draft Law on Climate Change and the Energy Transition. Article 10 of that draft law foresees that the government will develop specific plans for biomethane, hydrogen, and other renewable gases: (a) annual objectives for renewable gas penetration, (b) certification to allow supervision and control over obligations related to these gases, and (c) regulations to permit the injection of these gases into natural gas networks. See Ministry 2019c in References.

Neither biomethane nor hydrogen is considered interesting on a commercial basis in the very short term. However, renewable gas, especially hydrogen, has the potential to support the decarbonization of sectors that are very hard to electrify, especially certain industries and heavy transport, and to provide long-term storage for electricity.

It is as yet unclear to what extent the development of renewable gases will affect regulated gas networks. Some hydrogen projects using renewable electricity will not require access to regulated gas networks. Biomethane can generally be injected into the existing gas network with little or no difficulty, but the allowed blending limit for hydrogen in the Spanish transmission system is 5 per cent. While this could be raised, perhaps as high as 20 per cent, pure hydrogen supply would probably require new transmission pipelines and modification of distribution networks.

What, then, should be the basis on which the CNMC could develop a methodology that reflects the Ministry's guidelines regarding the penetration of renewable gas? We would suggest the following:

- Where renewable gas (or power-to-gas) projects are initiatives developed in competitive markets and do not require access to regulated gas networks, they can be ignored by the CNMC in its function as the regulator of gas networks. If these projects require subsidies to meet government policy objectives, the financing of those subsidies might be collected through a levy added to the network tariffs, but it would be far better if they were financed through the tax system, to avoid introducing distortions to the final gas price and in final energy markets.
- Where renewable gas projects require access to a regulated network, but do not require additional network investments or costs, the CNMC could introduce discounted tariffs aimed at facilitating the transit of renewable gas. This is consistent with our understanding of what the CNMC has proposed in the form of a tariff discount for injections into the local network of manufactured gases or gases from unconventional sources. This is of course a distortion that disadvantages natural gas. In any case, the CNMC or the government should somehow compensate the regulated network for the reduction in revenues associated with the tariff discounts intended to encourage renewable gas throughput.
- Where renewable gas projects, or projects integrating power and gas, require investment in existing or new regulated gas and/or electricity networks, the CNMC remuneration methodology is critical. Given the uncertain nature of the demand for use of the network, these are investments where RAB regulation is especially suitable because the investor is not taking demand-side risks and is earning a return from the outset. The CNMC may want to consider performance incentives to encourage the penetration of renewable gas, while ensuring that these are in addition to the RAB-related remuneration and do not undermine the attraction of the basic methodology, namely to lower risk and the cost of capital.
- Future governments may decide to subsidize renewable gas projects, with the subsidy going to the producer, the network company, or both. This would disadvantage natural gas and other competing energy sources – notably electricity – in final markets. Governments will need to assess the economic (and wider) case for subsidies, presumably on the basis of evidence that the benefits – especially avoided emissions – are greater than the costs of the subsidy. Where a subsidy is offered, to avoid further distortions in final energy markets we would recommend that it be financed directly through the public budget. We note that a sufficiently high carbon tax on all fossil fuel combustion would reduce and possibly eliminate the need for these subsidies.

5. Concluding recommendations

First, we recommend that the CNMC adopts a common remuneration methodology for all regulated energy network businesses in Spain, especially for *new assets*, including those required for gas distribution networks. The Regulatory Asset Base (RAB) approach is a suitable methodology, especially for encouraging investment in networks facing high risks. Adopting this common methodology would send a coherent and consistent signal to investors.

Second, there is a case for some reconsideration of the CNMC's analysis and conclusions for the future remuneration of *existing* gas network assets. The CNMC needs to demonstrate that, even if remuneration is reduced to some extent, investors will still be compensated adequately and that the companies will continue to support the investments needed to digitize processes, deliver natural gas, and eventually deliver renewable gas where it is economic to do so. The challenge when changing the regulatory model is to define a transition that seems reasonable, neither favouring the companies and their investors, nor punishing them. While any change to the methodology for remunerating existing assets could be viewed as indicating future regulatory risk, a firm, long-term commitment to a model that yields fair returns on investments should attenuate investor concerns about unfair future takings. This is an important signal for all the investors needed to participate in Spain's energy transition.

Third, the Ministry needs to clarify its plans for natural gas and renewable gas. Regulation should recognize the role of natural gas and provide incentives to maintain an operative gas network for as long as it is required and to make the necessary investments. Although renewable methane and hydrogen are not commercially viable at present, the PNIEC recognizes their potential, including for power-to-gas projects. Projects involving hydrogen may not use the regulated networks and may therefore not be subject to any CNMC remuneration decisions. However, if potential development of renewable gas will require access to regulated networks – and especially if the Ministry foresees that eventuality – the CNMC methodology must provide suitable incentives to maintain natural gas operations and to invest in network expansion and upgrading, as required. Even if no decision is made in the short term regarding hydrogen, it would be prudent to leave the door open, by making the regulation compatible with future decisions involving hydrogen development. If subsidies are required, we would recommend that they be financed through the tax system, rather than through an uplift to the price of gas.

Fourth, the CNMC and the Ministry need to coordinate the basis for remunerating gas network assets that are potentially stranded. The main question is whether the higher unit costs related to lower throughput should be borne by gas consumers or be financed in other ways. The CNMC will also need to decide how best to account for potentially stranded assets, for instance by accelerated depreciation or by leaving the assets on the books.

Finally, a broader issue for the Ministry and the CNMC to consider is how best to decarbonize the energy system as a whole rather than by approaching its separate components, in particular its electricity and gas sectors. Other countries are further advanced than Spain in their thinking about how hydrogen could support economy-wide decarbonization, and are debating how this might affect competitive energy markets, network planning, and regulation. The PNIEC appears to recognize the potential benefits of integrating the electricity and gas networks to enable power-to-gas as the basis for a large-scale electricity storage system. Even if this is very uncertain, it is important now to ensure that regulation of electricity and gas networks is compatible with future integration, in case that turns out to be the most efficient route to decarbonizing the economy.

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