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An austerity-driven energy reform

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The government's latest energy reform reflects an effort to reign in the electricity deficit, recently aggravated by weak demand and excess capacity, but questions remain as to whether or not it will be sufficient to eliminate the deficit, as well as to resolve regulatory uncertainty and improve investment climate in the sector.

In July 2013, the government approved a major overhaul of the Spanish electricity sector to correct existing imbalances that have led to an exponential increase of regulated electricity costs and a huge tariff deficit. The reform addresses the problem of financial sustainability of the sector, severely affected by weak demand and overcapacity. Previous regulation introduced in 2012 and early 2013, also aimed at restoring financial stability of the sector, failed to correct the tariff shortfall and new regulatory measures were needed to reduce the 4.5 billion euros forecasted deficit for 2013. The frequent change of the rules of the game in the sector has created regulatory uncertainty, more so as it is not clear that the present reform will be sufficient to eliminate the deficit. Moreover, the government has left the door open to new regulation that would deal with the price formation system. In general, short run financial criteria have prevailed, while efficiency principles and a long run perspective have little weight in the reform.

1. The need for reform

The size of the electricity tariff deficit implies a potential risk to Spain's public finances and therefore represents an urgent economic challenge facing the country. This deficit is the consequence of the steep and increasing gap between the price paid by consumers and all the elements included as regulated costs of electricity.[3]

The European Commission (EC, 2013) and the International Monetary Fund (IMF, 2013) have already recommended a deep overhaul of Spanish electricity regulation

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[2] UPV/EHU.

[3] See Espinosa (2013) and Espinosa and Pizarro-Irizar (2012).

and finding a lasting solution to the electricity tariff deficit. At the end of May 2013, the European Commission warned that the policy measures introduced during 2012 and in early 2013 in the Spanish electricity market were not sufficient to put a stop to the increasing tariff deficit and recommended a thorough reform.[4] According to the European Commission, the level of the Spanish electricity tariff deficit implies a potentially sizeable contingent liability for the budget and non-negligible macroeconomic risks.

There is no doubt that the evolution of the tariff deficit acts as a severe drag on the economy. According to government estimates, the shortfall would have widened to 10.5 billion euros this year (1% of Spanish GDP) without the measures undertaken in 2012 and early 2013. Even though these policy measures aimed at achieving financial equilibrium for the electricity system, a few months later they have not proven to be so effective. The government's new estimate is a tariff deficit of 4.5 billion euros for 2013, to be added to the outstanding electricity debt of 26.06 billion euros coming from the imbalances over the last decade. [5]

Thus, the pressure stemming from the large financial deficit in the energy sector has made reform unavoidable. Last February, the Spanish Congress had to approve 2.2 billion euros in funds to finance the deficit of regulated activities in the electricity market. It is clear that some policy action was urgently necessary. The July reform has distributed the forecasted 4.5 billion euros annual gap among consumers' energy bills (0.9 billion euros), firms (2.7 billion euros) and the state budget (0.9 billion euros). Yet distributing the power tariff shortfall among the market participants was by no means the only problem; the exponential growth of the costs of the system, including debt repayment, is also a sign of important deficiencies in market organization that the present reform fails to address.

2. The key features of the reform

The reform of the Spanish electricity system will be implemented through a new Electricity Act that will be approved by the end of 2013, a Royal Decree-law comprised of urgent measures with immediate effect and several decrees and ministerial orders. This regulatory change comes at a steep price for the electricity sector. Energy stock prices fell sharply as a reaction to the announcement and Spanish utilities have been placed on *Rating Watch Negative* (Fitch Ratings). The reform will also hit consumers hard as they will see their electricity bills increase. Foreign and domestic investors in the renewable energy sector have expressed strong opposition to these measures that have plunged the profitability of their projects, and have announced lawsuits challenging the retroactive nature of the reform.

[4] The Commission recommendations also include the improvement of competition in the retail electricity market and setting up an independent observatory. Concerning the transport infrastructure, the report concludes that it is abundant but there is scope to make the selection of investment more stringent and prioritize efficient maintenance of existing networks.

[5] The accumulated deficit is close to 38 billion euros but 11.8 billion euros have already been recovered through tariffs.

The new regulation has slashed regulated costs (remuneration to distribution, transmission and renewable generation) and raised consumers' electricity bills with immediate effects. It is estimated that the urgent cost reduction measures adopted, which will be effective for the second half of 2013, will cover only 1.4 billion euros of the 4.5 billion euros annual gap, while the rest will be covered by the 2.2 billion euros credit approved by Congress in February and the contribution of 0.9 billion euros by the state budget.

The new regulation sets limits on the tariff shortfall and cuts the possibility of transferring the deficit collection rights to FADE, the Deficit Securitization Fund for the Electricity System. Any future mismatch between tariffs and regulated costs will be financed by the firms with regulated revenues, at the market interest rate, and paid back over the following five years, in principle through rate increases.

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2.1 Renewable generation will bear the brunt of the cuts

The reform will have the greatest impact on regulation and incentives provided to renewable energy. According to government estimates, the cut will be 1.5 billion euros per year (15% of the subsidies to the special regime).

The FIT (feed-in-tariffs) have been completely eliminated for all existing generation units.[6] The reform introduces a new system to replace the FIT; generators will receive the market price for the electricity they generate and, if needed, subsidies to guarantee a fixed profitability over the life span of the project. For the next six years, this rate of return is referenced (before taxes) to the yield of the ten-year Spanish Treasury bond plus 300 basis points, around 7.5% - an unusual reference, given that WACC (weighted average of the cost of capital) is the standard rate for regulated activities (Miles and Ezzell, 1980; Nantell and Carlson, 1975).

To determine the level of subsidy each year, the formula takes into account all the past subsidies and revenues of the project. If the previous rate of return on assets is higher than the regulated value, the subsidy in that year is correspondingly decreased to reach a fixed profitability over the life span of the project. Furthermore, the formula uses investment and operating costs standards corresponding to an ideal efficient plant. Hence, profitability could be higher or lower depending on the regulatory benchmark, which has not yet been set.

[6] Previous measures included the elimination of incentives to new renewable projects and the limit on the number of subsidized hours of solar-energy electricity generation.

The proposal lacks detail, but regulation setting the technological benchmark for each plant is expected by the end of the year. This further regulation will fix the parameters affecting the benchmark plant's investment, operating costs and regulatory life span for each technology, as well as the estimates of the market price affecting the remuneration to the different renewable energy installations.

Setting the standard investment and operating costs is a task of insurmountable difficulty due to the large variability among different units depending on location, scale and the time of the investment. Renewable energy costs are site specific as resources (wind, sunlight,…) are not evenly distributed across regions. And this cost assessment is further complicated by the fast learning curve and significant declines in costs over time. As a consequence, the levelized cost of electricity (LCOE, the ratio of lifetime costs to lifetime electricity generation, both discounted back to a common year using a discount rate that reflects the average cost of capital) for each renewable technology cannot be accurately assessed unless it is made dependent on location, scale and time of investment (see IRENA, 2013[7]). If the standard costs are set as weighted averages, many plants will not be able to cover costs.

Since the new methodology is applied to past subsidies of the project, it tends to penalize the more mature generation units, particularly the wind plants. Furthermore, feed-in tariffs were proportional to the energy produced, so that the more efficient units, with larger production volumes, will see their future returns more drastically reduced.

Since the new methodology is applied to past subsidies of the project, it tends to penalize the more mature generation units, particularly the wind plants (some of them may have even exceeded the critical level of return so that they would no longer be subsidized). Furthermore**,** feed-in tariffs were proportional to the energy produced, so that the more efficient units, with larger production volumes, will see their future returns more drastically reduced. Table 1 presents the Spanish Energy Commission's forecast of incentives to the different renewable technologies in 2013, before the change in methodology (CNE, 2013). The new subsidies are likely to change the distribution among the different technologies.

[7] International Renewable Energy Agency.

Table 1: Incentives to the special regime, 2013.

Technology	Capacity 31/12/2013 (MW)	Energy 2013 (GWh)	Hours 2013	Equivalent FIT(€/MWh)	Total FIT (million €)
Cogeneration	6,314	27,122	4,296	73.6	1,997
Photovoltaic	4,405	7,151	1,623	402.4	2,877
Solar Thermal	2,521	4,778	1,895	251.8	1,203
Wind	24,188	54,943	2,271	42.7	2,344
Small hydro	2,064	6,509	3,154	43.2	281
Biomass	779	4,777	6,135	75.2	359
Waste	576	2,532	4,398	29.3	74
Waste treat.	658	4,440	6,747	103.7	461
Total	41.505	112,252	2,705	85.5	9,596

Source. CNE (2013).

Spain is now the third largest producer of solar energy in the European Union after Germany and Italy. According to the solar trade associations, 38 billion euros have been invested in the Spanish solar industry since 2007, most with debt that needs to be repaid within 10 to 15 years. Expected returns to solar energy had already been severely cut since the regulatory changes began in 2010 and the new reform further reduces the revenue of all renewable projects, which in some cases may no longer cover the cost of servicing their loans. The reduced payouts for renewable-energy generation may call for the banks to refinance loans to the industry or take over the assets.

Unsurprisingly, the reform is threatened by lawsuits due to its retroactive scope. The way past subsidies and revenues of renewable projects are taken into account to calculate the future capital investment subsidies is equivalent to applying the new regulation, and the reduced profitability, to the entire life of the project and changes the conditions under which the investments were undertaken.

The huge cuts to renewable energy come after the generous system of subsidies for the sector had generated an investment bubble. The lack of a market mechanism, that would make the level of the subsidies responsive to the needs and the ability to pay of the system, led to unsustainable financial obligations. The reform does not tackle this issue, which is at the heart of the problems that have built-up in the sector. The new methodology sets the principle of equal return for all renewable energy sources, but does not take into account their different cost of production and does not even consider the optimal technology mix. The reform has missed the opportunity to introduce market mechanisms that could provide the right signals to investors in the long run.[8] Even in the current circumstances, where investment is not required due to excess capacity, the reform should have considered the optimal technology mix and taken appropriate action to reduce the presence of less efficient technologies.

[8] See Ciarreta et al 2012a,b and 2013a,b.

Finally, the reform has also put in place changes that undermine the cost/benefit analysis for distributed (on-site) generation. Net metering[9] for residential installations is not considered and the introduction of a 'support levy' (*peaje de respaldo*) threatens the future of solar or wind self-generated energy by drastically reducing the financial returns homeowners and businesses would receive on their investment.[10] After the reform, these users may find it more expensive to produce their own energy than to buy it from the grid. Moreover, the obligation to connect to the grid for all the existing units (so that the home-produced energy can be taxed), under penalty of 6 to 30 million euros (clearly inappropriate for households who have a few solar panels on their roofs), has been strongly contested.

2.2 Distribution and transmission

One of the main objectives of the reform was the revision of remuneration to the activities of distribution and transport. According to the government estimates, the new regulation for transmission, distribution and extra costs of non-mainland systems will save 1 billion euros per year, a large contribution to the financial stability of the sector.

After the reform, distribution and transmission will be remunerated to guarantee a fixed rate of return to the net assets (the part of the investment not amortized). For the next six-year regulatory period, this rate of return is referenced (before taxes) to the yield of the Spanish Treasury bond plus 200 basis points, around 6.5%. Yet again, the reference to the ten-year Treasury bond is uncommon; WACC (weighted average of the cost of capital) is a more standard regulatory tool to remunerate the cost of the assets for utilities (see Cambini and Rondi, 2009). In addition, each year the regulator will fix the maximum investment level entitled to this return, which places a limit on regulated costs.

Regarding the incentives introduced in the proposal, Spain's National Energy Commission has recommended that the performance payments consider the consequences for consumers of supply failure so that the signals provided to the utilities would be correct from an economic standpoint.

2.3 Capacity

Apart from the cut in annual capacity payments, which is justified by the excess capacity in the system (see Table 2), the reform also includes capacity mothballing provisions that will affect combined cycle generation. Even though the intermittency of renewable production makes these units necessary, in the actual conditions of weak demand, some of the combined cycle plants are working at 10%

[9] Under net metering consumers receive retail credit for at least a portion of the solar or wind electricity they generate.

[10] A similar 'solar tax' is being considered in Arizona (*convenience fee*) but with a "20-year grace period" before being subject to the new policy.

of capacity. The new regulation will allow for 6,000 MW to hibernate, which will curb losses.

The exponential growth of the costs of the system and the resulting financial unsustainability are partly related to deficiencies in market organization that have led to overcapacity. The promotion of green energy through feed-in tariffs, which did not take into consideration the renewable capacity in the system or the optimal technology mix, has led to excessive investment incentives that must now be corrected. The reform promotes the closure of renewable facilities to decrease capacity and further alleviate the payouts for renewable energy generation, which will contribute to financial stability. However, it should be noted that the investment already made is a sunk cost and these units have a marginal cost close to zero, which makes closure not a wise economic decision.

Table 2: Evolution of the Reserve Margin in Spain.

	Installed Capacity, Ci (GW)	Available Capacity, Ca (GW)	Ratio Ca/Ci	Extreme peak demand (GW)	Reserve Margin
2000	52.83	38.22	72.36	33.24	1.15
2005	73.97	48.58	65.68	43.38	1.12
2010	99.04	55.59	56.13	44.12	1.26
2012	101.83	59.78	58.70	43.01	1.39
Minimum Required					1.10

Source: Ciarreta et al (2013b).

2.4 Consumers' electricity bills

According to government estimates, the increase in energy bills will amount to 900 million euros per year and 450 million euros in 2013. Around half of the bill paid by consumers corresponds to the payment for the energy consumed, with a fixed and a variable component. The fixed term, or 'power charge', applies for having the service available, regardless of how much electricity is used, and depends only on the maximum power (kW) set in the electricity contract. The variable charge, the 'usage charge', depends on electricity consumption. The new regulation increases substantially the fixed charge in the bill (77% increase for consumers with power less than or equal to 10kW) and brings down slightly

On average the increase in the final bill is estimated at 3.2% with large variability depending on the consumption profile. The change in consumer pricing, with more weight on the fixed component of the bill, does not seem justified by the cost structure of the electricity system and is mainly driven by the need to increase revenues in the actual context of weak demand.

the price paid for each kWh of consumption. As a result, the energy bill will increase substantially for consumers with low consumption and decrease for consumers with high consumption levels. On average the increase in the final bill is estimated at 3.2% with large variability depending on the consumption profile.

The change in consumer pricing does not seem justified by the cost structure of the electricity system and is mainly driven by the need to increase revenues in the actual context of weak demand (CNE, 2013). Although those consumers with higher price-elasticity could decrease their bills by reducing the power contracted,[11] the new regulation provides no incentives for efficiency measures that reduce consumption.

Thus, the regulatory change has aimed at increasing revenues by increasing the fixed term in consumers' bills, where elasticity is bound to be very low, but no effort has been made to improve efficiency by providing consumers with appropriate signals. Furthermore, the access charges should be designed so as to distribute the regulated costs in a way that reflects the costs that consumers impose on the system. This principle would encourage the agents to take efficient decisions.

3. The impact of the reform on the tariff deficit

According to the government estimates, transmission costs for 2013 are reduced by 180 million euros, distribution costs by 348 million euros and subsidies to renewable energy by 750 million euros. Table 3 presents regulated revenues and costs for 2013 after the reform.

Table 3. Projected costs and revenues for 2013 after the reform

(million euros)	REVENUES	COSTS		
Regulated revenues	14,678			
Regulated costs (access charges, capacity payments and other regulated activities)		20,581		
Transmission			1,492	
Distribution			5,070	
Feed-in-tariffs and diversification			10,075	
Recovery deficit from regulated activities			2,629	
Non-mainland generation			925	
Other			390	
Regulated Revenue-Cost				-5,903
Other revenues	5,922			
Tax measures (Law 15/2012)	2,647			
CO2 emission auctions	150			
State budget	925			
Credit	2,200			

Source: Ministerio de Industria, Energía y Turismo. *Propuesta de orden por la que se revisan los peajes de acceso de energía eléctrica*, July 2013.

[11]The Spanish Energy Commission has recommended that the new price schedule should not be applied immediately and has asked for a transition period in which consumers should be informed of the regulatory changes and to allow them time to change their contracts with electricity providers (CNE, 2013).

Regarding the deficit for 2013, Spain's National Energy Commission (CNE, 2013) considers that the uncertainty regarding the revenue from tariffs is very high. First, it is very sensitive to the demand level. If demand decreases in the interval of -1.5% to -3.5%, revenues would decrease by 200-300 million euros. Second, as a reaction to the increases in the fixed term in their bills, consumers may change their contracts in order to decrease the power component in their bills.

An important question is whether the tariff deficit has been tackled conclusively with this sector overhaul. Beyond its effect on the deficit in 2013, the reform has been heralded as the definitive reform that would prevent future deficits. To this purpose the reform has tried to build automatic adjustments within the sector's regulation, so that any future cost increases are matched with higher revenues.

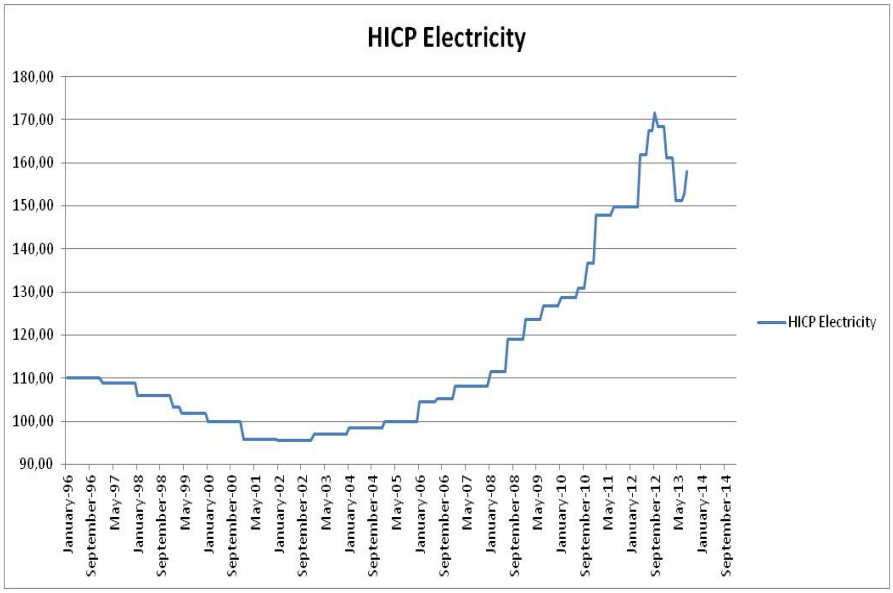
The Electricity Bill[12] to be approved later this year puts in place a limit for the deficit. In particular, the limit is set at 2.5% of the system revenues, and the accumulated deficit cannot be higher than 10% of the annual revenues. Within those limits, firms will finance the shortfall proportionally to their entitlement to revenue, and will recover those amounts in the following five years. Above those limits, rates will be revised to cover the excess deficit.

If the shortfall exceeds those limits, then the Bill (Art. 19) states that tariffs should be increased to cover the excess. However, if the shortfall rises well above the critical level such a rise may be unfeasible, so that new regulatory changes may be necessary to prevent excessive consumers' price increases. In fact, according to the government the present reform is introduced to prevent price increases of 42% in 2013, which would have been required to cover the tariff deficit.

The problem is that, even though any deficit should be followed by an increase in the electricity price, further consumer price increases of a magnitude sufficient to cover significant deficits simply may not be feasible. Exhibit 1 shows the monthly evolution of the *Harmonized Index of Consumer Prices: Electricity for Spain* (Eurostat).[13] Consumer electricity prices in August 2013 were 58% higher than the same month in 2005.

[12] Anteproyecto de Ley del Sector Eléctrico.
[13] http://research.stlouisfed.org/fred2/series/CP0451ESM086NEST

Exhibit 1



Harmonized Index of Consumer Prices: Electricity for Spain. Year 2005=100.[14]

Source. Eurostat

This recent evolution of consumer electricity prices may make it impossible for future deficit to be offset by further rate increases. In any case, until additional details about the specifics of the reform are made public and the market participants are able to respond to the measures, it is difficult to evaluate whether the reform will be sufficient to contain the deficit in the short term.

4. Outlook for the future

Despite several controversial aspects of the reform, there is agreement on the need for regulatory change that would achieve financial stability. However, there has been opposition to the current reform for several reasons. First, it is not clear that the regulatory changes will be sufficient to eliminate the deficit, although presumably they will narrow the annual tariff shortfall. Second, the reform faces legal challenges in national and international courts due to its retroactive scope. Third, it negatively affects the financial system due to the high debt in wind and solar projects which may cause a wave of loan defaults. Fourth, it is likely to be followed by new regulation

[14] The Harmonized Index of Consumer Prices (HICPs) for the European Union are calculated by Eurostat using statistics provided by the Member States on price changes and the consumption patterns of consumers within their economic territories. Information on electricity prices is collected for both household and industrial consumers. Each category of *domestic standard consumers* is characterized by specified annual consumption and standard dwelling, and is expected to possess specific household facilities and appliances. *Industrial standard consumers* are users with an annual consumption above 30,000 kWh and several categories are considered, based exclusively on the amount of annual consumption.

dealing with market design and the price formation system and therefore it does not resolve the uncertainty of the agents involved.

The effect on investment climate will depend on how the reform is perceived by the markets. In their statement released following the announcement by the Spanish government of new regulatory measures, Fitch Ratings views '*the proposal as a further sign of increasing political risk in the sector*.' Furthermore, according to the rating agency report, there is no confidence that the new regulation will eliminate the tariff deficit: '*It remains to be seen if the new proposal is more successful in TD reduction, after the regulatory measures introduced in 2012 and in early 2013 did not achieve this goal*.'

It is difficult to evaluate precisely the impact of the continuous changes in regulation on an already deteriorated investment climate, but it is clear that the reform has not only missed the opportunity of mitigating uncertainties, but its retroactive scope has inflicted irreparable damage on future investment prospects in different sectors.

It is difficult to evaluate precisely the impact of the continuous changes in regulation on an already deteriorated investment climate, but it is clear that the reform has not only missed the opportunity of mitigating uncertainties, but its retroactive scope has inflicted irreparable damage on future investment prospects in different sectors. Regulatory risk certainly damages the image of Spain as a stable destination for investment flows.

In a market where investment decisions have consequences for decades, a long term perspective is essential. However, beset by financial imbalances, the reform deals only with deficit distribution. No action is taken to improve the market design or the technology mix or to promote energy efficiency. While good regulation should provide an environment where investment and consumption decisions are guided by economic signals, the present reform penalizes the more mature and efficient renewable production units and worsens the incentives for consumers' energy saving.

This reform is part of Spain's austerity drive and it was certainly needed to ensure financial stability, but efficiency and market design issues should not have been ignored. In particular, regulation concerning renewable energy should take into account the country's optimal technology mix (see Ciarreta et al, 2013b). Rather than payment schedules that are supposed to be effective for 15-25 years, and that have proven impossible to maintain, the promotion of green energy should be explicitly responsive to market conditions and existing capacity, and investors should be aware of this when making their investment decisions. A well designed incentive scheme would have avoided retroactive measures that change the rules of the game midstream.

The reform of the wholesale electricity market (the pool), announced for 2014, could further contribute to financial stability in the sector, but it should not overlook efficiency issues. Regulation and market design should not only guarantee proper

functioning under present circumstances of weak demand and excess capacity, but also over the longer-term, in order to provide stability to the sector and remove regulatory uncertainties.

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