



THE NEW PAYMENT MECHANISM OF RES-E IN SPAIN

INTRODUCTORY REPORT

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**Co-ordinator:
Manuel Bustos
International Policy Analyst**

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1. Introduction

The *Spanish Official State Journal* published on 27 March 2004 the *Royal Decree 436/2004*, dated 12 March 2004, on the methodology for updating and systematizing the legal and economic regime of electric power installations within the *Special Regime*. This Decree, which entered into force one day later, has repealed the *Royal Decree 2818/1998* that has regulated the economic regime of the electricity produced from renewable energy sources since 1 January 1999¹. The *Royal Decree 436/2004* fits into the existing general framework supporting RES-E as set out by the *Electricity Act 54/1997*, which remains completely in force.

¹ The new Decree has also repealed the *Royal Decree 841/2002* that laid down the first incentives for renewable installations to participate in the power market.

2. New payment mechanisms

Pursuant to article 22 of the *Royal Decree 436/2004*, the owners of the electric power installations within the *Special Regime* that were fully registered at the "*Administrative Register of Generating Facilities under the Special Regime*" later than 28 March 2004² will have to choose when selling their production between **two options**³:

→ **OPTION ONE**: to sell the electricity to the distribution company. In this case, the owners of the installations will be entitled to receive as remuneration:

- 1) A **regulated tariff** per kWh applied to all their output.
 - This *regulated tariff* consists of a **percentage of the Average Electricity Tariff (AET)** published every year⁴.
 - As far as renewables are concerned, **this percentage will range between the 80% and the 90% of the AET**, except for solar PV and solar thermoelectric plants whose percentage may go above 90%.
 - This *regulated tariff* will be invoiced to and paid off by the distribution company whose grid receives the power produced by the generating facility.⁵

² All the renewable installations built after the coming into force of the new Decree and even those that were under construction at that time but had only made the preliminary registration will be fully covered by this new Decree.

³ Once made the choice between the two payment options, the owner of the renewable installation will not be entitled to change to the alternative option until one year later.

⁴ The *Average Electricity Tariff (AET)*, also called "*Reference or Benchmark Tariff*", has been defined in detail by the *Royal Decree 1432/2002*, published in the *Spanish Official State Journal* on December 31 2002, as "the relation between the costs forecast as necessary to remunerate the activities whose intention is the supply of electricity and the forecast for the same period under consideration of demand from final consumers which is determined by the Ministry of Economy". The costs considered are basically as follows: production costs, transmission costs, distribution costs, supply costs, permanent costs of the system (stranded costs, National Energy Commission costs, System operator costs, market operator costs and island overcosts) and supply diversification and security costs (nuclear moratorium costs, nuclear fuel costs and premiums of the *Special Regime*). The concrete amount of the *AET* is published at the end of every year by the Royal Decree that sets the annual electric tariff for the next year. The *AET* for the year 2004 amounts to 7.2072 €/kWh. According to the *Royal Decree 1432/2002*, the *AET* will be increased between 1.4 and 2 per cent every year until the year 2010.

- 2) Plus a **reactive power service supplement** also set as a percentage of the *Average Electricity Tariff (AET)* published every year⁶. Its amount is set according to the sort and installed power of the plant and according to the hourly period in which the reactive power is delivered. This supplement is also invoiced to and paid off by the distribution company.

- 3) Plus a **supplement for continuity of the supply against voltage dips**. It is only applicable to wind farms during four years⁷ provided that they:
 - Have the necessary technical equipments to contribute to the continuity of supply against voltage dips, including the appropriate co-ordination of protections.

 - Can show to the distribution company and the DG of Energy a certificate issued by the manufacturer proving that those technical equipments are installed.

This supplement has been set by the *Decree 436/2004* as equivalent to 5% of the *Average Electricity Tariff (AET)* published every year. This supplement should be invoiced to and paid off by the distribution company.

⁵ The distribution company must conclude a standard contract with the owner of the generating facility within one month from the time when the connection point and its conditions are determined. The contract shall be for a minimum term of five years. The term of this contract is not really very relevant as far as the owners of the generating facilities are entitled to connect them to the distribution or transmission company's grid, transfer all their output to the electricity system through the electricity distribution or transmission company and receive for it the remuneration laid down within the *Special Regime*. The invoice for the power transferred to the electricity distribution or transmission company will be sent to them on a monthly basis using a standard format and must be paid within the 30-day period following the reception of the corresponding invoice. However, these distribution and transmission companies are entitled to be settled by the *National Energy Commission* for the amounts paid as regulated tariffs, premiums, incentives and complements to the RES-E generators. At the end of the process, those amounts are paid by all electricity consumers. This framework is in general the same provided for by the *Royal Decree 2818/1998*, just repealed by the *Royal Decree 436/2004*, and the *Royal Decree 2017/1997*.

⁶ See footnote 4 above.

⁷ The Decree excludes other renewable technologies from this supplement without any solid reason.

→ **OPTION TWO:** to **sell the electricity freely in the market** through the mechanism of daily sale bids managed by the market *pool* operator (OMEL) or through bilateral or term contracts. In both cases, the owners of the installations will be entitled to receive as remuneration:

- 1) The **hourly price** per kWh set in the electricity *pool* or, in case of bilateral or term contracts, the price freely agreed with the purchaser.⁸
- 2) Plus a **premium** per kWh. This premium consists of a percentage of the *Average Electricity Tariff (AET)* published every year. Its amount is set according to the sort and installed capacity of the plant. This premium is invoiced to and paid off by the distribution company. The Decree foresees that renewable installations may renounce the premium for a period of at least one year⁹. During this period, they will have to remain selling their output to the market.
- 3) Plus an **incentive per kWh for participating in the market**. This incentive also consists of a percentage of the *Average Electricity Tariff (AET)* published every year. Its amount is also set according to the sort and installed capacity of the power plant. This incentive is invoiced to and paid off by the distribution company.
- 4) Plus a **reactive power service supplement** also set as a percentage of the *Average Electricity Tariff (AET)* published every year. Its amount is also set according to the sort and installed capacity of the power plant and according to the hourly period in which the reactive power is delivered. This economic supplement is invoiced to and paid off by the distribution company. However, renewable facilities that sell their output to the market will be able to renounce to this economic supplement and take part

⁸ The renewable producers that take part in the market will have to submit offers to the production market operator whether directly or indirectly through a sales agent that will act as their representative. Sales agents can also represent producers when signing bilateral or term contracts. Any sales agent may submit an offer representing a group of renewable producers.

⁹ The aim of this renunciation may be to get revenues that would not be compatible with the premiums such as those coming from selling their *green attributes* as *green certificates* or *RECS* in the international markets.

voluntarily in the voltage control operative procedure and its corresponding remuneration mechanisms.

- 5) Plus a **capacity payment** under the same conditions and requirements applied to plants operating within the *Ordinary Regime*.
- 6) Plus a **supplement for continuity of the supply against voltage dips**. It is only applicable to wind farms during four years provided that they:¹⁰
 - Have the necessary technical equipments to contribute to the continuity of supply against voltage dips, including the appropriate co-ordination of protections.
 - Can show to the distribution company and the DG of Energy a certificate issued by the manufacturer proving that those technical equipments are installed.

This supplement has been set by the Decree as equivalent to 5% of the *Average Electricity Tariff (AET)* published every year. This incentive is invoiced to and paid off by the distribution company.

The concrete percentages of the *Average Electricity Tariff (AET)* applicable respectively to the regulated tariff, the premiums, the incentive for participating in the market and the reactive power supplement for renewable installations up to 50 MW¹¹ have been set by the *Royal Decree 436/2004* as follows¹²:

¹⁰ The Decree excludes other renewable technologies from this supplement without any reason.

¹¹ In principle, according to the *Electricity Act 54/1997*, the *Special Regime* for renewables, waste and Cogeneration is only applicable to installations up to 50 MW. However, that same *Act* foresees that the Government may set a premium to supplement the remuneration of those facilities using non-consumable and non-hydraulic renewable energies with an installed capacity greater than 50 MW. These plants must sell freely their output in the market. Considering especially future offshore wind farms in Spain, the new *Decree 436/2004* provides for that for those renewable facilities above 50 MW "the Government may determine the right to the receipt of a premium equivalent to 30% of the *Average Electricity Tariff (AET)*" for their first 15 years in operation. For those facilities using consumable or hydraulic renewable energies with an installed capacity greater than 50 MW that premium would be only of 25% of the *Average Electricity Tariff (AET)*" for their first 15 years in operation. Regarding offshore wind farms the new Decree provides for that the National Government (not the Provinces as is usual for onshore wind farms) will be responsible for their administrative authorisation.

¹² The first period begins to run as of the first day of the month after which the official full commissioning was issued. This period is applied retroactively to existing plants except for those that want to remain under the transitory regime until 2007. The full registration of the facility in the *Administrative Register of Generating facilities under the Special Regime* shall be a prerequisite for the economic regime to be enforced to any facility. Any electric power that might have been delivered to the grid as a result of a

RES-E Technology			Regulated Tariff (% AET)	Premium (% AET)	Incentive (% AET)
S O L A R	PV	< 100 kW	575% first 25 years 460% onwards	-	-
		> 100 kW	300% first 25 years 240% onwards	250% first 25 years 200% onwards	10%
	Thermoelectric¹³		300% first 25 years 240% onwards	250% first 25 years 200% onwards	10%
W I N D	Onshore	< 5 MW	90% first 15 years 80% onwards	40%	10%
		> 5 MW	90% first 5 years 85% from year 6 to 15 80% onwards	40%	10%
O W E R	Offshore¹⁴	< 5 MW	90% first 15 years 80% onwards	40%	10%
		> 5 MW	90% first 5 years 85% from year 6 to 15 80% onwards	40%	10%
H Y D R O	Small	< 10 MW	90% first 25 years 80% onwards	40%	10%
	Medium	> 10 MW < 25 MW	90% first 15 years 80% onwards	40%	10%
		> 25 MW < 50 MW	80%	30%	10%

trial operation prior to the full formal commissioning shall be remunerated at 50% of the *Average Electricity Tariff (AET)*. This latter provision seems completely unfair for the producer since there is no reason for not fully remunerating the electricity generated and delivered to the grid during the trial periods.

¹³ These installations may use auxiliary equipments consuming natural gas or propane only for keeping the temperature of the heat accumulator. The electricity produced from such fuels cannot be higher than the 15% of the total output of the plant as far as it sells the electricity freely in the market. On the contrary, if the plant sells its electricity to the distribution company the production from such fossil fuels should be lower than the 12% of the total output as far as they are only used when the generation of electricity is interrupted.

¹⁴ It is the first time that the Spanish support system distinguishes offshore wind farms from onshore facilities.

RES-E Technology		Regulated Tariff (% AET)	Premium (% AET)	Incentive (% AET)
I O M A S S	Energy crops¹⁵ Agricultural waste Forestry waste Garden waste	90% first 20 years 80% onwards	40%	10%
	Biogas Biofuels Pellets Manure Sludge	90% first 20 years 80% onwards	40%	10%
	Forest. indust. waste Mixed biomass fuels	80%	30%	10%
O T H E R S	Geothermal energy Wave energy Tidal energy Sea streams energy Ocean thermal energy Hot rocks energy Dry rocks energy	90% first 20 years 80% onwards	40%	10%

¹⁵ Power stations must use any of those biomass sources as their main fuel. "Main fuel" means any biomass fuel that accounts for at least 70% of the primary energy used, as measured by the net calorific value. For agro industry wastes, forestry industry wastes and mixed biomass fuels that percentage shall reach to 90%.

3. Revision of tariffs, premiums and incentives

The *Royal Decree 436/2004* provides for two parallel ways of revising the tariffs, premiums, incentives and supplements:

- In 2006, and every four years from then onwards, the Government shall carry out the revision of the tariffs, premiums, incentives and supplements set out within the new Decree. This revision should take into account:
 - The conclusions from the monitoring reports on the state of fulfilment of the *Spanish Renewable Energy Plan 2000-2011*.
 - The cost of the different RES-E technologies.
 - The participation of the *Special Regime* in coverage of demand.
 - The impact of the *Special Regime* on the technical and economic management of the electrical system.

- The respective amounts of the tariffs, premiums and incentives shall be also revised by the Government as soon as the installed power of each one of the renewable technologies reaches the absolute targets shown below¹⁶:

RES-E	Target
Solar PV	150 MW
Solar Thermoelectric	200 MW
Wind power	13,000 MW
Small hydro	2,400 MW
Biomass	3,200 MW

¹⁶ These targets are the same as foreseen for 2011 within the updated version of the *Spanish Renewable Energy Plan*.

The tariff changes resulting from any of these two revision tracks will be only applicable to those installations commissioned later than January 1st of the second year after the year the revision was approved.¹⁷

¹⁷ For instance, the new regulated tariffs adopted in 2006 will only be applicable to those wind farms commissioned from 1st January 2008 onwards.

4. Power production forecast and deviations

As of 1 January 2005, all the generating facilities of electricity from renewable energy sources with a capacity higher than 10 MW¹⁸ that sell their output to the distribution company at a *regulated tariff* must communicate to the distribution company¹⁹ the power production they forecast to transfer to the grid in each one of the twenty four scheduling hourly intervals of the electricity production market in each day, giving at least thirty hours advance notice of that day. Likewise, they may make corrections to that schedule with one-hour advance notice of the start of each intra-day market.

As of 1 January 2005, a deviation cost shall be passed on to the installations referred to above provided that the difference or deviation in each one of the scheduling intervals between the forecast power and the real output delivered is more than:

- 20% higher or lower for solar (PV or Thermoelectric) and wind power plants.
- 5% higher or lower for any other RES-E plants.

The deviation cost will be calculated each month as the result of multiplying the sum of all the absolute deviations over those thresholds within the month by the 10% of the *Average Electricity Tariff (AET)* published every year.²⁰ This cost will be included by the corresponding installations in the invoice sent monthly to their distribution company.

Those renewable installations that opt to sell their electricity into the market will have obviously to fulfil the forecast obligation and pay the deviation costs required within the market rules (10% of the daily market price multiplied by the deviations). In this case, the deviations costs are applied immediately (not as of 1 January 2005) to all installations regardless of their capacity (not only for plants > 10 MW).

¹⁸ Small hydropower facilities are therefore not affected by these obligations.

¹⁹ If the generating facility is connected to the transmission grid the communication must also be done to the System Operator.

²⁰ For instance, if a wind farm has had deviations above 20% during two days within one month, the producer will have to sum the MWh deviated above 20% of both days (90 MWh, for instance) and multiply them by 10% of the *AET* (7.3081 €/kWh in 2005, for instance). The penalty to pay that month would be of 657 €.

5. Transitory provisions for existing plants

All the existing renewable facilities, except for solar installations²¹, that were covered by the *Royal Decree 2818/1998* and were fully registered at the *Administrative Register of Generating Facilities under the Special Regime* upon the coming into force of the *Royal 436/2004* (28 March 2004) may choose between two options:

→ **OPTION ONE**: remain under a transitory economic regime until 1 January 2007 at the latest²². During this transitory period, those installations will have to sell their output to the distribution company at the final hourly price of the production market supplemented by a specific premium for each technology as follows²³:

<i>RES-E Technology</i>	<i>Premium 2004</i>
<i>Wind power</i>	2.7500 €/kWh
<i>Small hydro power</i>	3.0373 €/kWh
<i>Biomass (Primary)</i>	3.4224 €/kWh
<i>Biomass (Secondary)</i>	2.5970 €/kWh
<i>Geothermal energy</i> <i>Wave energy</i> <i>Tidal energy</i> <i>Hot rocks energy</i> <i>Dry rocks energy</i>	3.0373 €/kWh

²¹ Solar installations (PV or thermoelectric) are not entitled to any transitory regime so they are automatically covered by this new regime as of 28 March 2004.

²² All renewable facilities that were covered by the *Royal Decree 2818/1998* shall be automatically covered by the new regime once expired the transitory period on 1 January 2007.

²³ Actually, the new Decree lays down a new economic regime for these plants. First of all, because the former fixed prices are no longer available. Secondly, because the amount of the premiums for these installations are not the same as within the former regime. This changes have raised metering problems in those plants, mainly small hydro facilities, that were used to selling their output at a fixed price and therefore did not have their meters adapted to an hourly metering.

These premiums shall be adjusted annually by the Ministry in line with the variation in the *Average Electricity Tariff (AET)*.

However, it should be taken into account that:

- The provisions set out by the *Royal Decree 436/2004* to calculate and settle payment of the cost of deviation will be fully applicable even to those existing facilities remaining under the transitory regime as of 1 January 2005.
- These installations will be covered by the former reactive power service supplement.²⁴
- Except for the economic regime, all the remaining provisions within the new Decree are applicable to those existing facilities.
- The provisions of the new *Royal Decree 436/2004* must be enforced in case of any expansion of those existing facilities. As far as the output is concerned, they will be only applicable to the electric power proportional to the capacity of the expansion.

→ **OPTION TWO: be fully covered by the new regime set out by the *Royal Decree 436/2004*** by means of express notification to the Directorate General for Energy. The terms within the new economic regime will be applied retroactively to existing installations.²⁵ Once covered by this new Decree, the facilities involved will not be able to go back to their former economic regime.

²⁴ It shall be the general supplement provided for in the legislation of tariffs. Should the capacity factor of the power assigned to the distribution company be higher than 0.9, the supplement shall be a payment for the producer and should it be lower it shall be a discount.

²⁵ For instance, if a wind farm with a capacity of 20 MW commissioned on 1 January 1999 decides to be covered by the new regime and chooses the regulated tariff it will not be able to enjoy the first payment term of five years at 90% of the *Average Electricity Tariff (AET)* since it will be regarded as already expired on 1 January 2004. So, this wind farm would get under the new regime only 85% of the *AET* until 1 January 2014. The only way to get the maximum percentage from the beginning would be to carry out a repowering with an investment at least 50% higher than the initial investment.

However, around 20% of the existing small hydro facilities in Spain were not covered by the *Royal Decree 2818/1998* but by the previous *Royal Decree 2366/1994*. These installations may choose to:

- **Remain under their specific economic regime until 31 December 2010²⁶**. However, they will have to follow the regime set out by the new *Royal Decree 436/2004* to calculate and settle payment of the cost of deviation as of 1 January 2005. Moreover, the provisions of the new *Royal Decree 436/2004* must be enforced in case of any expansion of those existing facilities. As far as the output is concerned they will be only applicable to the electric power proportional to the capacity of the expansion

- **Sell their output freely in the market** according to the new economic regime set out in the new Decree. This choice must be kept for at least one year after which the installations will be able to go back to the former economic regime.

- **Be fully covered by the new regime set out by the *Royal Decree 436/2004*** by means of express notification to the Directorate General for Energy. Once covered by this new Decree, the facilities involved will not be able to go back to their former economic regime.

²⁶ As far as the remuneration for stranded costs given to conventional generators is not removed earlier by the Government.

6. Global evaluation of the new Decree

- In the recitals of this new Decree, the Ministry states that the concept of sustainable development should be “one of the key elements of the economic policy of any Government”. Besides this general statement, the Decree expresses its commitment to renewables by adding that “renewables must be encouraged by the Estate” since they contribute to protect the environment and, at the same time, guarantee a quality power supply to all consumers.

In order to fulfil both goals the *Electricity Act 54/1997* already included some generating facilities (renewable, waste and cogeneration) under a *Special Regime*, which entitles them to enjoy some singular legal and economic conditions against the *Ordinary Regime*, namely:

- The right to connect the renewable installations in parallel to the corresponding distribution or transmission company’s network.
- The right to transfer or incorporate their power to the system through the electricity distribution or transmission company.²⁷
- The right to receive in return for that output a remuneration supplemented by a premium²⁸.

In principle, the new *Royal Decree 436/2004* seems to fit into the legal framework set out by the *Electricity Act 54/1997* since it seems to keep in place those three basic cornerstones. However, APPA considers that the new Decree does not respect in fact the basic payment mechanism set out by the *Electricity Act*. This latter legal text provides for very clearly (arts. 30,3 and 16.1) that the basic remuneration mechanism for renewable

²⁷ Provided that it is technically possible for the grid to absorb it.

²⁸ According to Article 30 of the *Electricity Act*, fully in force, “the premiums shall be worked out by the Government after consultations with the Autonomous Provinces so that the price of electricity sold by these installations lies somewhere in the range of 80 and 90 per cent of the average electricity price that will be calculated by dividing the revenue from electricity supply billing by the power supplied. However, the Government may authorise premiums higher than 90% of that average for solar power installations. To work out the premiums the Government shall take into account the voltage level on delivery of the power to the grid, the effective contribution to environmental improvement, to primary energy saving and to energy efficiency, and the investment costs incurred so as to achieve reasonable profitability rates with reference to the cost of money on capital markets”.

installations consists of the sum of the marginal price set in the *pool* (without having to make offers to the market) + a capacity payment + ancillary services payment + a premium. Later, the *Royal Decree 2818/1998* added the *fixed price* option and even a third option (making offers to the market and supplement that price with a premium). While these latter two payment options have been kept in the new Decree, the only basic payment mechanism enshrined in the Law has been ruled out.²⁹

→ **The new Decree seems certainly to improve some shortcomings of the former framework**, namely:

- **The lack of a time-guaranteed period of payment for the premiums and tariffs.** Although the *Royal Decree 2818* stated that “the established incentive for RES facilities has no time limit placed on it”, the new regulated tariffs, premiums and incentives are now defined for the whole life of the renewable facilities. This is in principle a clear step forward towards a more secure and stable framework for developers, investors and financiers.
- **The lack of a transparent and objective methodology for calculating and updating the amount of the premiums and tariffs.** The link of the new renewable tariffs, premiums, incentives and supplements with the annual evolution of the *Average Electricity Tariff (AET)* is a second step forward to gain objectivity and transparency.³⁰
- **The revision of the premiums every four years within the 80-90 per cent range affected all facilities under the former regime.** With the new Decree, any revision will only be applicable to future installations, what it is a key point for the security of the investment.

→ However, APPA has highlighted **the contradiction between those theoretical goals of security and stability claimed by the Decree and the legal treatment given within the same Decree**

²⁹ Faced with this apparent unlawfulness APPA will probably have to file a lawsuit against this new Decree.

to those renewable facilities already in operation or construction by 27 March 2004. APPA believes that these installations should have been given the right to keep completely under the former regime with any change at all during their whole life. The so-called *transitory regime* is not really a transitory scheme but an *ex novo* regime that ends in 2007³¹. If the payment framework for existing facilities is changed overnight, how can we be confident that new framework will be respected in the future for all facilities built under their provisions? Unfortunately, the new Decree sets a bad precedent in this field. Moreover, we think that it is also unfair that those existing facilities that pass to the new regulated tariff are forced to count the tariff periods retroactively.

- **These are some of the evidences that show that this new Decree has been drawn up too precipitately and without having a wide consensus among the Spanish renewable industry.** Quite the opposite that happened with the former *Royal Decree 2818/1998* whose draft was widely debated and negotiated for almost two years. The fact that the new Decree was adopted by an interim Cabinet one day after the 11-M bombing in Madrid and two days before the General elections is the clearest indication of this hasty procedure.³²

- According to the new Decree, all renewable installations are abided by the requirement of forecasting their output and pay penalties in case of deviations. **APPA believes however that this obligation should have not been imposed on those installations covered by the regulated tariff due to its low incidence on the grid.** Nevertheless, its implementation should be postponed in order to give producers more time to adapt their facilities and refine the imperfect forecast tools currently available.

³⁰ However, APPA claims that this link with the *AET* could have been introduced in the former *Decree 2818/1998* without having to draw up a completely new text and change the whole framework.

³¹ Moreover, the mechanism for updating the premiums under this new transitory scheme keeps the same insecure and subjective elements of the former Decree.

³² The Socialist Party, now in office, expressed then its dissatisfaction with this new Decree. It is likely that the new Government will therefore change it soon.

→ **One of the professed goals of this new Decree is also to strengthen the market elements within the Spanish support system.** Some recitals of the Decree make it clear when stating that “*the participation of renewable installations in the market is encouraged in order to reduce the administrative intervention in the setting of the electricity price as well as to allocate better and more efficiently the costs of the system, specially those referred to the deviation management and the supply of ancillary services*”. Actually, the new Decree is bringing the *Special Regime* closer to the *Ordinary Regime*. Under the new Decree those facilities that opt for the market will have to really make offers to the wholesale *pool* under the same requirements set out for conventional generators.³³

However, **the option given to renewable facilities to sell their electricity by making offers to the wholesale market is not really new in the Spanish support system.** Actually, it was already provided for by the *Royal Decree 2818/1998* (article 18,5) and then even specifically encouraged by the *Royal Decree 841/2002*, both just repealed by the new Decree. Nevertheless, this full market option was not followed at all by any renewable producer since the incentives set then were not attractive enough.

Even the *regulated tariff* is indirectly based on the market generation price since it is linked to the *Average Electricity Tariff (AET)* which is by definition changing every year according to the forecast demand of electricity and the forecast costs of supplying it to the final customers.

→ Will this new attempt by the Ministry to encourage the participation of renewable facilities in the *pool* market be eventually successful? After evaluating the payment options given to renewable producers within the new Decree, the answer to that query seems to be positive: **the most profitable remuneration option seems to be selling the output into the market.** The two tables below show the preliminary estimates made by APPA for wind power for the years 2004 and 2005:

³³ Nevertheless, it is important to stress that the former main remuneration scheme under the *Royal Decree 2818/1998* (market price + premium) was already market driven since following the wholesale power *pool* price implied making offers to the market at 0 €/kWh.

WIND POWER 2004 estimate	New regulated tariff option			New market option (€/kWh)	Transitory regime³⁴ (€/kWh)
	90% AET (€/kWh)	85% AET (€/kWh)	80% AET (€/kWh)		
Regulated tariff³⁵	6.486	6.126	5.765	-	-
Forecast market price	-	-	-	3	3.72 ³⁶
Premium	-	-	-	2.882	2.75
Market incentive	-	-	-	0.720	-
Reactive power supplement	0.252 ³⁷	0.252	0.252	0.252	0.23 ³⁸
Capacity payment	-	-	-	0.55 ³⁹	-
Voltage dips supplement⁴⁰	0.360	0.360	0.360	0.360	0.360
Deviation costs⁴¹	-	-	-	- 0.105	-
Forecast costs⁴²	-	-	-	- 0.03	-
Sale agent costs	-	-	-	- 0.10 ⁴³	-
TOTAL REMUNERATION⁴⁴	7.098	6.738	6.377	7.529	7.060

³⁴ It will end on 1 January 2007.

³⁵ The Average Electricity Tariff (AET) set for the year 2004 is 7.2072 €/kWh.

³⁶ Average price in 2003.

³⁷ Estimate of 3.55% of the AET. Other assessments are a bit lower (3%).

³⁸ Estimate of 3.55% of the market price plus the premium. Other assessments are a bit lower (3%).

³⁹ Estimate based on the average of the last two years for a wind farm with 3,000 full load hours.

Another estimate within the industry is a bit lower: 0.48 €/kWh.

⁴⁰ Only during four years. It does not include the investment cost that may be required to get this supplement.

⁴¹ As of 1 January 2005 for wind farms > 10 MW under the regulated tariff or the transitory regime. For installations under the new market option the deviations costs are applied immediately to all installations regardless of their capacity. The estimates consider a wind farm of 2,500 full load hours with a deviation of 35%. Another estimate within the industry is slightly higher: 0.12-0.15 €/kWh.

⁴² Estimate for a wind farm of 25 MW of capacity and 2,500 full load hours during three years. Another estimate within the industry is slightly higher: 0.05 €/kWh.

⁴³ Another estimate within the industry is slightly lower: 0.08 €/kWh.

⁴⁴ The average price paid to wind energy producers during the last three years was of 6.7 €/kWh. The fixed price in 2003 was 6,21 €/kWh.

WIND POWER 2005 estimate	New regulated tariff option			New market option	Transitory regime⁴⁵
	90% AET (€/kWh)	85% AET (€/kWh)	80% AET (€/kWh)		
Regulated tariff⁴⁶	6.577	6.211	5.846	-	-
Forecast market price	-	-	-	3	3.72 ⁴⁷
Premium	-	-	-	2.923	2.75
Market incentive	-	-	-	0.730	-
Reactive power supplement	0.252 ⁴⁸	0.252	0.252	0.252	0.23 ⁴⁹
Capacity payment⁵⁰	-	-	-	0.550	-
Voltage dips supplement⁵¹	0.365	0.365	0.365	0.365	0.365
Deviation costs⁵²	- 0.108	- 0.108	- 0.108	- 0.105	- 0.108
Forecast costs⁵³	- 0.03	- 0.03	- 0.03	- 0.03	- 0.03
Sale agent costs	-	-	-	- 0.10 ⁵⁴	-
TOTAL REMUNERATION⁵⁵	7.056	6.690	6.325	7.585	6.927

⁴⁵ It will end on 1 January 2007.

⁴⁶ The Average Electricity Tariff (AET) for the year 2005 will be at least 1.4% higher than that in 2003. Therefore, a conservative forecast for 2005 would amount to 7.3081 €/kWh.

⁴⁷ Average price in 2003.

⁴⁸ Estimate of 3.55% of AET. Another assessments are a bit lower (3%).

⁴⁹ Estimate of 3.55% of the market price plus the premium. Another assessments are a bit lower (3%).

⁵⁰ Estimate based on the average of the last two years for a wind farm with 3,000 full load hours. Another estimate within the industry is a bit lower: 0.48 €/kWh.

⁵¹ Only during four years. It does not include the investment cost that may be required.

⁵² As of 1 January 2005 for wind farms > 10 MW under the regulated tariff or the transitory regime. For installations under the new market option the deviations costs are applied immediately to all installations regardless of their capacity. The estimates consider a wind farm of 2,500 full load hours with a deviation of 35%. Another estimate within the industry is slightly higher: 0.12 -0.15 €/kWh.

⁵³ Estimate for a wind farm of 25 MW of capacity and 2,500 full load hours during three years. Another estimate within the industry is slightly higher: 0.05 €/kWh.

⁵⁴ Another estimate within the industry is slightly lower: 0.08 €/kWh.

⁵⁵ The average price paid to wind energy producers during the last three years was of 6.7 €/kWh. The fixed price in 2003 was 6,21 €/kWh.

→ **The main potential economic benefits arising from the new market framework are likely to be achieved much more easily by utilities active in the renewable sector than by small and medium-sized independent producers.** Firstly, because utilities have already had a long experience in the *pool* market, and secondly, because their mix of production will help them to balance positive and negative deviations both among their widely distributed facilities and between different technologies. Last but not least, their higher economies of scale will reduce their management costs. The new framework is likely to encourage small independent producers to make joint offers to the market through sale agents in order to reduce their market risks.

→ Within the recitals of this new Decree, the Ministry expresses its certainty that thanks to these new provisions the fulfilment of the Spanish renewable power target (30.6% of the electricity demand by 2010-2011) will be achieved. Is this forecast realistic?

▪ **Wind power**

If we take into account that:

- Most of the wind sites that should be developed in the next years to reach the wind power target already set (13,000 MW by 2011) have less wind resources than those sites already developed.
- The expected average investment cost to develop those new wind farms will no longer fall but, on the contrary, will rise above 1,000 €/kW due to the higher costs of larger wind turbines.

Only an attractive, rising tariff for wind energy will be able to deliver the set target. As far as the new remuneration framework is linked to the *Average Electricity Tariff (AET)* and the *AET* is expected to increase between 1.4 and 2 per cent every year at least until the year 2010, it seems that, provided that the preliminary estimates are right, the new framework is likely to

deliver the additional 7,000 MW required to achieve the planned wind energy target by 2011.

- **Bioelectricity**

One recital of the new Decree states that “*whatever remuneration scheme is chosen, this Royal Decree guarantees both a reasonable remuneration of their investments to the owners of the Special Regime facilities and a reasonable assignment of the power systems costs to the electric consumers*”. However, the new Decree fails to give the required boost to bioelectricity since the prices resulting from it (as much as 6.7 €/kWh under the regulated tariff, 7.1 €/kWh in the full market option and 7.2 €/kWh under the transitory regime, all in 2004, compared to 6.8 €/kWh under the former fixed price) are far from the 8.5 €/kWh required at least, according to APPA assessments, to ensure profitable investments in biomass in Spain. Unless biomass is developed, the Spanish renewable target will remain out of reach.⁵⁶

- **Solar**

The new provisions are very positive for solar PV installations. First of all, because the former 5-kWp frontier between the two different premium levels has been raised to 100 kWp. Therefore, much larger installations will be covered by the higher tariff. Secondly, because installations below 100 kWp will receive a regulated tariff for 25 years beginning at 41,44 €/kWh in 2004 (compared to a fixed price of 39,66 €/kWh in 2003). Nevertheless, it will not be easy to reach the 144 MWp set as a target for the year 2011 taking into account that there are only 27 MW already in operation.

Regarding solar thermoelectric, the fact that the new premium (18 €/kWh) is much higher than the existing one (only 12 €/kWh) will help to launch these installations into the market for the first

⁵⁶ At the end of 2003, there were only 361 MW in operation of bioelectricity in Spain. The target for the year 2011 is to reach 3,098 MW.

time. The ambitious goal is to reach 200 MW by 2011 (0 MW currently in operation).

- **Small hydro power**

The installed capacity based on small hydro resources is growing very slowly in Spain since only 110 MW were added during the last three years to reach a total installed capacity of 1,699 MW. This slow development has nothing to do however with the amount of the premiums. On the contrary, the environmental and administrative barriers are to blame for a failure that places the 2011 target (2,380 MW) out of reach.

Although the new estimate tariffs for small hydro seems even a bit higher than those in place so far (up to 7,2 €/kWh in the new market option, 6.9 €/kWh under the transitory regime and 6.8 €/kWh in the regulated tariff in 2005 compared with a fixed price of 6,2 €/kWh last year), the new Decree does not help to remove the current environmental and administrative barriers that prevent small hydro power to deploy all its untapped potential.

To sum up: **if Spain wants to achieve its renewable energy targets by 2010/2011, additional policies and measures are required. In principle, the new Decree may help to ensure the continuity of the current wind energy development in Spain so as to reach its specific target (13,000 MW). However, it is not giving the required boost to bioelectricity and small hydro facilities which contribution is essential to reach the global target (30.6% in 2011).**