



**EXPERT EVALUATION NETWORK
DELIVERING POLICY ANALYSIS ON THE
PERFORMANCE OF COHESION POLICY 2007–2013
YEAR 1 – 2011**

**TASK 1: POLICY PAPER ON RENEWABLE ENERGY AND
ENERGY EFFICIENCY OF RESIDENTIAL HOUSING**

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**A report to the European Commission
Directorate–General Regional Policy**

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LIST OF ABBREVIATIONS

- EEN – Expert Evaluation Network
- ENE 2020 – National Strategy for Energy
- ERDF – European Regional Development Fund
- ERSE – National Energy Services Regulation Entity
- ESCO – Energy Service Companies
- ESF – European Social Fund
- kW – Kilowatt
- MWh – Megawatt hour
- NSRF – National Strategic Reference Framework 2007–2013
- OP – Operational Programme
- PNAEE – National Action Plan for Energy Efficiency
- PNAER – National Action Plan for Renewable Energy
- PV – Photovoltaic
- RES – Renewable Energy Sources

1. EXECUTIVE SUMMARY

The National Strategy for Energy has adopted a diversified typology of measures to promote RES and energy efficiency. The most important features of the Portuguese energy public policy are related to the adopted tariff system, the legislative and regulatory framework, and tax incentives. The legislative framework regulates the production of electricity from RES by a scheme of feed-in tariffs, and gives priority to RES in terms of network planning and development. With the increase of the share of RES in energy production, public expenditure with feed-in tariffs has increased significantly and, consequently, there is currently a need to review tariffs and find alternatives schemes for more mature technologies.

The main measures implemented by national policies to promote energy efficiency in residential housing are: the Solar Thermal Programme, energy certification for buildings, bonus tariffs for RES-E of small scale installed in combination with solar water heaters, tax benefits of energy efficiency gains through home improvements, implementation of Energy Service Companies (ESCOs) and replacement of inefficient equipment.

ERDF support for RES under the NSRF amounts to 0.7% of the total ERDF and Cohesion Fund funding, and mostly takes the form of subsidies to innovative pilot initiatives. In the Regional OPs, the Structural Funds allocation to RES varies significantly between regions. Regional OPs include a specific set of support measures in the fields of renewable energy and energy efficiency, framed by a common Energy Specific Regulation. Support Schemes for companies also support projects in renewable energy, including Energy Service Companies. The support for the creation of a Pole of Competitiveness and Technology for Energy is also important.

Regarding energy efficiency, the NSRF has allocated 1% of the ERDF and Cohesion Fund resources to this policy area. However, the relative weight of energy efficiency in residential housing is marginal.

The promotion of renewable energy sources and of energy efficiency are among the objectives set by ERDF programmes. These state a clear rationale for public intervention in both areas which is aligned with the national strategies for this sector. The OPs present intervention strategies and objectives for these areas, based especially on their importance for the diversification of the economic base, the competitiveness of enterprises and the fulfilment of the national energy potential. Although in almost every OP the allocation of financial resources varies according to production technologies, the strategic guidelines presented in the programming documents do not make a clear distinction between renewable energy sources that should be supported and the rate of support does not depend on profitability. By the end of 2009, the commitments associated with renewable energy were basically insignificant, around 0.2% of the allocated resources for the promotion of RES in NSRF, and measures to promote energy efficiency in residential housing also have a marginal relative weight.

2. NATIONAL POLICY

The National Strategy for Energy (ENE 2020) defines a clear commitment by the Portuguese government to renewable energy as a way to reduce extreme dependence on foreign energy sources, strengthen the energy mix, and increase security of supply as well as to promote the development of an industrial cluster associated with this sector. The public strategy for Renewable Energy Sources (RES), embodied in the National Action Plan for Renewable Energy (PNAER), has adopted a **diversified set of measures**, of which the most important are of an indirect nature. These include a fixed tariff system, the legislative and regulatory framework, and tax incentives. However, the National Action Plan for Renewable Energy also includes direct measures such as subsidies for the purchase of RES equipment and financing of large projects, such as the National Programme for Dams with High Hydroelectric Potential the Amareleja PV solar plant and RES biomass plants.

The programmed **public investment in RES support** for the 2005–2012 period amounts to EUR 8.1 billion, varying between the different RES, with around 63% directed to RES wind and 12% to RES hydro.

Table A – Programmed public investment in RES, 2005–2012 (EUR billion)

Wind	Hydro	Biomass	Solar	Wave	Biofuels	Biogas	Small scale RES-E	TOTAL
5.1	1.0	0.5	0.5	0.15	0.3	0.3	0.25	8.1

Source: Ministry for the Economy, Innovation and Development, 2007

Since 1988, Portugal has adopted a legislative framework that regulates the production of electricity from RES by introducing a scheme of feed-in tariffs, and giving priority to RES in terms of network planning and development. With the evolution of the electricity market and its liberalization, this framework has been updated several times until the principle of the feed-in tariffs **differentiation by production technology** was introduced in 2001. The current tariffs in force were updated in 2007 by Decree No. 225/2007 of May 31 establishing the indicative average rates and the validity of the tariff associated with each technology (Annex Table A). In 2009, an official act of the government added high enthalpy geothermal energy to the list of supported technologies.

Between 2005 and 2008, a new mechanism was adopted to support renewable electricity production through tendering schemes for wind and biomass plants, which were based on criteria of cost and implementation time, a requirement for concurrent companies to comply with certain requisites. These schemes allowed for a general decrease in the RES tariffs and – at least in the case of wind power – led to positive impacts on job creation and industrial development for the equipment supply of new plants. In order to minimize the impacts (and

opposition) at local level related to the installation of wind farms, Decree No. 225/2007 also provides that 2.5% of the monthly payments to the entity that receives the electricity will be paid to the municipality where the wind farm is located.

With the increase of the share of RES in energy production, public expenditure with feed-in tariffs has also increased significantly, particularly in the past 4 years. However, this type of support to RES has become increasingly harder to justify in the case of more mature technologies – such as wind power – which are becoming more competitive also in the face of the oil prices surge. Given this, the terms of the Economic and Financial Adjustment Programme recently agreed on by the Portuguese Government, the European Commission, the European Central Bank and International Monetary Fund, report the need to **review** the feed-in tariffs for new RES contracts, and to find alternative incentive schemes for more mature technologies, such as market premiums. The reduction in tariffs should be the object of a study report and is still not defined.

Regarding the promotion of residential housing energy efficiency, the National Action Plan for Energy Efficiency (PNAEE) establishes the following as major measures:

- The **Solar Thermal Programme** promoted the installation of solar panels in residential housing. The government subsidized approximately EUR 1,600 for each kit purchased (including installation, maintenance and auxiliary equipment), where the beneficiaries may use the credit lines agreed by the government with several banks. Beneficiaries could still benefit from a limited tax deduction of the investment. In 2009 this programme was supported by the State Budget in the context of the anti crisis measures;
- With the implementation of **energy certification for buildings in 2009**, transferring the European Energy Performance of Buildings Directive into national legislation, every new household has to respect minimum certification requirements, and every house sold or rented has to be certified, indicating possible energy improvements. Until the 1st trimester of 2011 around 5% of the residential buildings in Portugal were certified, but the impact of this measure in terms of market premium for energy efficiency – either in housing prices or in rents – is still not noticeable.
- Apart from the production system set by the feed-in tariffs, there are **bonus tariffs for RES-E of small scale** (up to 3.68 kW), which must be installed in combination with solar water heaters. This production system is based on a tariff of 650 EUR/MWh, which is also differentiated by technology, as follows: 100% solar, 70% wind, 30% hydro, 30% biomass.
- Other measures related to **urban renewal** (tax benefits of energy efficiency gains through home improvements), **implementation of energy service companies** (Energy Service Companies) and **replacement of inefficient equipment** (light bulbs, etc.).

Some of the recent **changes** observed in the national energy policy were deliberately designed to increase positive externalities in the current economic downturn context, namely the characteristics of the tendering procedures for wind and biomass plants, the inclusion of the residential housing sector as beneficiary of the Solar Thermal Programme and the Energy Efficiency in Public Buildings measure. The latter two involved total investments of 82.3 million Euros in 2009 and 90.7 million Euros in 2010.

The national energy policy is defined by the central administration and there are **no regional variations** in terms of the programmed investment or the type of support. However, the National Strategy for Energy assumes that investment in RES creates opportunities for development in regions with lower levels of socioeconomic development as, due to geophysical features, most of the investments are carried out in the poorest regions of inland Portugal, i.e., in the Convergence regions of Norte, Centro and Alentejo.

3. ERDF AND COHESION FUND SUPPORT AND CONTRIBUTION TO NATIONAL POLICY

The measures to promote renewable energy and energy efficiency supported by the European Regional Development Fund (ERDF) under the National Strategic Reference Framework 2007–2013 (NSRF) have mainly a **complementary function** considering the overall measures of the national energy policy, including those envisaged in the National Action Plan for Renewable Energy and the National Action Plan for Energy Efficiency. This is due to the fact that the Structural Funds are seen primarily as tools that enhance structural changes and, therefore, should go beyond the measures provided for in other instruments of national public policy. But there are also two major constraints in the articulation between national policy and ERDF support: first, the use of ERDF Funds for the support of RES co-existing with feed-in tariffs is only allowed under NSRF for innovation or demonstration projects; second, ERDF funds in Portugal cannot directly fund the residential segment.

The measures provided for these domains in the NSRF are part of a set of measures provided in sectoral strategic planning instruments. However, the measures supported by the ERDF were clearly supposed to go primarily towards the funding of innovative pilot initiatives, whether for energy production through RES, or the rational use of energy.

Strategic **coherence** between national policies and NSRF is also reflected in the type of supported technologies, and the effort to adjust NSRF measures to the changes in the national policy introduced by the National Strategy for Energy should be stressed. In fact, with the approval of this strategy in 2010, changes were introduced in the NSRF Energy Specific Regulation in order to accommodate support to the use of biomass systems, in line with the importance given to this RES by the National Strategy for Energy.

There were also **changes** to the NSRFs measures on energy efficiency, aiming at contributing to the national strategy for responding to the crisis. Thus, the ERDF regulations were reviewed to broaden the scope of eligibility of expenditure on energy efficiency and to simplify eligibility rules, allowing flat-rate reimbursement of certain expenses or fixed cost reimbursements. Eligibility in this field has been extended, incorporating costs for the promotion of energy efficiency of residential housing under the Action Programme for Partnerships for Urban Regeneration (a measure from the Regional OPs on the Mainland).

The ERDF support for RES under the NSRF amounts to EUR 104.6 million (0.7% of the total ERDF and Cohesion Fund funding) shared between the Regional OPs and two thematic OPs (Territory Valorisation OP and Competitiveness Factors OP), and mostly takes the form of subsidies to innovative pilot initiatives. These resources are distributed by RES in the following order: wind (32%); hydroelectric, geothermal and others (26 %); biomass (23%); and solar (19%). In comparison with the programmed public investment by RES (Table A, Chapter 2), it is evident that ERDF resources are supporting in similar **proportion** the same RES as the national energy policy.

For the Regional OPs, the Structural Funds allocation by RES varies significantly between regions. For example, in the Alentejo – the region that has the greatest potential for solar energy production in Europe and where one of the largest photovoltaic plants in the world has been built recently–, 35% of the resources are allocated for solar power. In the Centro region, where the largest forest areas in the country are located, energy production from biomass has a higher incentive proportion (31%). On the contrary, in the Northern Region the resources were evenly allocated (25%) among the four types of RES considered.

The Lisbon (Competitiveness), Algarve and the Azores (Convergence) Regional OPs do not have resources allocated to categories of expenditure related to RES. However, the Autonomous Regions of the Azores and Madeira are benefiting from the resources allocated in the Territory Valorisation OP for wind power (EUR 15 million) and for hydro, geothermal and other RES (EUR 10 million).

The Regional OPs of Portugal Mainland include a specific set of support measures in the fields of renewable energy and energy efficiency, framed by a common Energy Specific Regulation. These measures support the creation of an innovative regional energy framework, based on structuring criteria and practices for energy efficiency, the widespread use of RES and increased penetration of the energy vectors with less environmental impact.

Other measures under the Support Schemes for companies (transversal measures of the Mainland's Regional OPs and the Competitiveness Factors OP) also support projects in renewable energy. For example, the Innovation Support Scheme for technology demonstration projects and the Support Scheme for Research and Technological

Development support certain types of projects that produce bio-fuels, in particular innovation projects and technology demonstrations (concentrated solar experiments in Évora, the wave demonstration projects in Peniche or wind offshore projects currently planned to enter the demonstration stage). Moreover, the Innovation Support Scheme promotes the creation of Energy Service Companies and the establishment of "Efficiency Contracts ", as defined by the National Action Plan for Energy Efficiency.

Finally, another indirect contribution for this domain given by the Competitiveness Factors OP in the form of encouraging the creation of Collective Efficiency Strategies (Poles of Technology and Competitiveness, Clusters) is also worth mentioning: the Pole of Competitiveness and Technology for Energy – EnergyIN –, funded by some of the largest companies in the energy sector and the MIT Portugal Programme. This pole was created in order to foster cooperation between business and scientific communities to promote innovation and competitiveness in this sector. In practice, EnergyIN participates in defining priority types of projects to be supported under NSRF. Recognizing the strategic importance of particular projects for the sector, it contributes to an increased financial incentive of such projects, under the NSRF Support Schemes.

By the end of 2009, the commitments associated with these measures were basically insignificant, around 0.2% of the allocated resources for the promotion of RES in NSRF. This low **performance** level is directly related to the fact that the type of projects eligible under NSRF were put on hold or discarded with the crisis, especially in the case of the support schemes to innovation and R&D in which companies are the main beneficiaries.

Nevertheless, there have been no significant changes in the scale, form or focus of ERDF support since the beginning of the programming period.

As to the promotion of energy efficiency, the NSRF has allocated EUR 146.7 million for energy efficiency, co-generation and energy management and EUR 6.2 million for housing infrastructure (totalling 1% of the ERDF and Cohesion Fund resources in NSRF). However, ERDF measures that include promoting energy efficiency in residential housing have a marginal relative weight, and most resources are directed towards energy efficiency in SMEs and public buildings.

For instance, the solar thermal programme – which in 2009 was funded by the State Budget in order to support residential solar heating – was **complemented** in 2010 by ERDF support schemes through all the Regional OPs, but directed at public and social services buildings. Another example lies in the creation of the JESSICA Holding Fund Portugal, financed by ERDF and by the State Budget, which allows the funding of urban regeneration projects with a strong focus on RES and energy efficiency.

4. RATIONALE FOR PUBLIC INTERVENTION

The documents that support the NSRF, the Territorial Valorisation and Competitiveness Factors thematic OPs and the seven ERDF Regional OPs, clearly indicate its objectives include the promotion of renewable energy and energy efficiency. The **rationale** behind the use of ERDF programmes for energy is aligned with the national strategies for this sector.

In general, a section of the diagnosis and SWOT analysis in all the programming documents of the aforementioned OPs focus on energy issues. Moreover, all these OPs present intervention strategies and objectives for these areas, based not only on their environmental benefits, but also (and especially) on their importance for the diversification of the economic base, the competitiveness of enterprises, the fulfilment of the national energy potential and, ultimately, the achievement of the objectives of the national energy strategy.

In fact, as stated in the Competitiveness Factors OP, the promotion of energy efficiency and renewable energy is of a strategic nature (privileging forms of production with technological and market risks), and fosters innovation and technological development in the energy field through the national Centres for R&D. It should also be noted that the Energy Specific Regulation that is transversal to the five Regional OPs in Portugal Mainland, clearly indicates that its objectives take into account the strategic guidelines of the National Strategy for Energy and the National Action Plan for Renewable Energy.

However, although in almost every OP the allocation of financial resources varies according to production technologies, the strategic guidelines presented in the programming documents do not make a clear **distinction** between renewable energy sources that should be supported and do not mention its **costs** compared to other sources of non-renewable energy.

As already described in Section 2, there is a current **public debate** about the national policy for the development of RES, related to the increasing cost of support to RES through the feed-in tariffs scheme. In order to comply with the terms of the Economic and Financial Adjustment Programme, the new government elected in June 2011 will have to re-evaluate the efficiency of the feed-in tariffs scheme, reduce the tariffs for new RES contracts, and find alternative schemes for more mature technologies. There is also a debate about the sustainability of the solar thermal market without the public support to the installation of solar water heater in residencies that was in place during 2009. The end of this type of support is expected to bring about a decline in the growth rate of solar panels installed in the area, jeopardizing the achievement of the national 2020 targets and damaging a still emerging market.

5. RATE OF SUPPORT AND PROFITABILITY

In the Portuguese ERDF programmes the rate of support may vary according to the nature of the operation, hence influencing its potential payback period and profitability.

ERDF support may also vary according to the nature of the beneficiary, somehow reflecting – at least indirectly – their self-financing capabilities. For instance, by recognizing the crucial role that municipalities could play in the increase of the overall NSRF implementation rates, in February 2011 the Portuguese Government signed an agreement memorandum with the National Association of Municipalities which, in practice, increases the scale of support for expenditure presented during 2011 to 85%. This measure has an indirect impact on support for energy efficiency, through programmes like JESSICA or Partnerships for Urban Regeneration. This measure does not imply any differentiation between support to different RES, but it only applies to the Convergence regions.

Other than that, the rate of support tends to remain stable, despite changes in contextual factors such as the evolution of fossil fuels and electricity prices.

6. COSTS, PUBLIC SUPPORT AND PRICES

Renewable energy

According to the most recent information published by the National Energy Services Regulation Entity (ERSE) in March 2011, the average cost of energy by technology is as follows:

Table B – Average cost of energy, by technology, in 2010 and 2011 (EUR/MWh)

RES	Biogas	Biomass	Other Cogen.	Renew. Cogen.	Wind	PV	Hydro	Urban Solid Waste
2010	107.2	108.1	104.2	90.5	91.6	329.9	88.6	80.8
2011*	110.2	110.4	109.5	94.1	92.9	340.4	91.1	81.7

* 2011, until March.

Source: ERSE

Since 2003, the National Energy Services Regulation Entity has regulated the convergence of electricity prices between the Mainland regions and the Autonomous Regions of the Azores and Madeira and, through legislation measures, the resultant compensatory payments have been supported equally by all electricity consumers.

The programmed public investment in RES support for the 2005–2012 period amounts to EUR 8.1 billion. The amount of public support given to each type of RES is defined by Decree-Law n. 225/2007, which defines the indicative average feed-in tariffs and support

periods for RES (Annex Table A). Also according to the most recent information published by the National Energy Services Regulation Entity regarding the definition of tariffs and prices for electricity prices in 2011, the current amount of support to RES (over-cost) by technology is:

Table C – Over costs with RES, by units produced

RES	Biogas	Biomass	Other Cogen.	Renew. Cogen.	Wind	PV	Hydro	Urban Solid Waste
EUR/MWh	72.19	72.29	68.88	56.88	56.19	270.59	53.90	46.10
EUR 10 ³	5,053	42,384	290,395	88,735	476,402	54,118	39,214	20,999

Source: ERSE

Energy efficiency in residential housing

The newest feature of the energy certification procedure at present makes it impossible to establish strong correlation between a building's energy classification and its market value. Although there are no studies on the national real estate market, it is estimated that a good energy classification can increase the property value by 10% to 15%.

The tendency of the national real estate market is that properties with higher market value show more efficient energy performances, and the energy classification is assumed to guarantee increased quality of construction, which ultimately influence the price factor. With regard to new buildings, all tend to be more energy efficient and their energy classification results from the overall quality of the building construction, perceived as an asset in its marketing.

As for residential renting, it is still a very informal market and constrained by a legal framework which promotes the absence of contracts. In this respect, energy certification tends to be non-existent, unless the transactions are undertaken by real estate companies. However, even in these cases an effective impact of energy classification on the definition of the property value is still not evident.

7. CONCLUSIONS

Energy policy and, in particular, RES and energy efficiency support, have been a major priority of public policies in Portugal in the past decade, and they have contributed to the successful achievement of the overall objectives of the national energy policy. As a result of financial and fiscal supports to RES investment, currently over 40% of the electricity produced in Portugal is based on the use of RES and about 20% of final energy consumption is satisfied with the use of renewable energy.

However, the success of the RES promotion policies and, in particular, the feed-in tariff mechanism, has had an increasing repercussion on the growth of public expenditure for RES support. In the current context of severe public financing constraints, the amount of public support for RES through feed-in tariffs should soon be under revision, especially in the case of more mature technologies.

Although the measures supported by ERDF contributes to the objectives of the national energy strategy, and NSRF OPs state a clear rationale for public intervention in both policy areas, throughout the past programming periods the focus of support has clearly moved from the *hardware* (i.e., the infrastructure networks) to the *software* (i.e., support for R&D, innovation, demonstration projects, Energy Service Companies, networking between companies, universities and R&D centres, etc.). However, in the current context of economic downturn, the potential beneficiaries have dropped or put on hold the type of projects which could be eligible for NSRF support and therefore the number of applications and the implementation rate has been less than satisfactory.

The national policies for energy efficiency in residential housing, defined in the National Action Plan for Energy Efficiency, have also been very effective and presented some noticeable results. In the current programming period, ERDF support plays an important role in the promotion of energy efficiency in the public sector and in companies. However, as ERDF funding for the residential segment is very limited, the potential impact in terms of energy efficiency for residential housing is sparse.

Given the poor performance of NSRF measures to support renewable energy and energy efficiency of residential housing, these measures should be revised in order to further diversify the type of projects supported, and to broaden the scope of the beneficiaries.

REFERENCES

A New Energy ERA – Efficiency, Renewables and clean thermal generation and Advanced grid and storage infrastructure, (Vision Paper for the EU Strategic Energy Technology Plan), Ministério da Economia e da Inovação.2007, 191 pp.

Alteração aos regulamentos específicos relativos a tipologias de investimento susceptíveis de financiamento pelos programas operacionais regionais do continente, Comissão Ministerial de Coordenação dos Programas Operacionais Regionais do Continente, Ministério da Economia, da Inovação e do Desenvolvimento, Gabinete do Secretário de Estado Adjunto, da Indústria e do Desenvolvimento, Abril de 2011, 19 pp.

Azores Regional Government – Planning and Structural Funds Regional Directorate (2010) – 2009 Annual Implementation Report of the Azores Operational Programme for Convergence.

Azores Regional Government – Planning and Structural Funds Regional Directorate (2006) – Azores Operational Programme for Convergence.

Diário da República, 1.ª série — N.º 97 — 20 de Maio de 2008, pp. 2824 – 2865

Energias Renováveis em Portugal, Direcção Geral da Energia e Geologia (Organizador), Jornal Expresso (Media partner), Ministério da Economia e da Inovação, Outubro de 2007, 60 pp.

Energy Policies of IEA Countries, Portugal 2009 Review, International Energy Agency, 2009, 180 pp.

Financing Renewable Energy in the European Energy Market – Final Report, Ecofys, Ernst & Young, Fraunhofer, TU Wien, 2 de Janeiro de 2011, 264 pp.

Informação sobre Produção em Regime Especial (PRE), Portugal Continental, ERSE – Entidade Reguladora dos Serviços Energéticos, Maio de 2011, 14 pp.

Madeira Regional Government (2006) – Madeira Autonomous Region Economic Potential and Territorial Cohesion Valorisation Operational Programme.

Madeira Regional Government (2010) – 2009 Annual Implementation Report of the Madeira Autonomous Region Economic Potential and Territorial Cohesion Valorisation Operational Programme.

Management Authority of the Alentejo Regional Operational Programme 2007–2013 (2006) –Alentejo Regional Operational Programme.

Management Authority of the Alentejo Regional Operational Programme 2007–2013 (2010) – 2009 Annual Implementation Report of the Alentejo Regional Operational Programme.

Management Authority of the Algarve Regional Operational Programme 2007–2013 (2006) – Algarve Regional Operational Programme.

Management Authority of the Algarve Regional Operational Programme 2007–2013 (2010) – 2009 Annual Implementation Report of the Algarve Regional Operational Programme.

Management Authority of the Centro Regional Operational Programme 2007–2013 (2006) – Centro Regional Operational Programme.

Management Authority of the Centro Regional Operational Programme 2007–2013 (2010) – 2009 Annual Implementation Report of the Centro Regional Operational Programme.

Management Authority of the Lisboa Regional Operational Programme 2007–2013 (2010) – 2009 Annual Implementation Report of the Lisbon Regional Operational Programme.

Management Authority of the Lisbon Regional Operational Programme 2007–2013 (2006) – Lisbon Regional Operational Programme.

Management Authority of the Norte Regional Operational Programme 2007–2013 (2006) – Norte Regional Operational Programme.

Management Authority of the Norte Regional Operational Programme 2007–2013 (2010) – 2009 Annual Implementation Report of the Norte Regional Operational Programme.

Management Authority of the Operational Programme for Competitiveness Factors (2006) – Operational Programme for Competitiveness Factors.

Management Authority of the Operational Programme for Competitiveness Factors (2010) – 2009 Annual Implementation Report of the Operational Programme for Competitiveness Factors.

Martins, Álvaro, Santos Vítor, *Formulação de Políticas Públicas no Horizonte 2013 relativas ao tema Energia*, Instituto de Economia e Gestão, Novembro de 2005, 101 pp.

Memorando de Entendimento Sobre as Condicionalidades de Política Económica (Tradução do conteúdo), Governo português, Maio 2011, 35 pp.

National Action Plan for Energy Efficiency (Results 2009), ADNE – Agência para a Energia, Maio de 2010, 21 pp.

NSRF Observatory (2007) – National Strategic Reference Framework Portugal 2007–2013.

NSRF Observatory (2009) – “2009 NSRF Strategic Report”.

NSRF Observatory (2010) – “2009 NSRF Strategic Report II”.

Plano Nacional de Acção para a Eficiência Energética – Relatório de Execução 2009, ADENE – Agência para a Inovação, Junho de 2010, 33 pp.

Plano Nacional de Acção para as Energias Renováveis ao Abrigo da Directiva 2009/28/CE – Versão Final (De acordo com o modelo estabelecido pela Decisão da Comissão de 30.06.2009), República Portuguesa, 2009, 135 pp.

Plano Nacional de Acção para Eficiência Energética (Resultados), ADNE – Agência para a Energia, Maio de 2010, 21 pp.

Plano Novas Energias ENE 2020, Ministério da Economia, da Inovação e do Desenvolvimento, 2010, 23 pp.

Portugal Eficiência 2015 – Plano Nacional de Acção para a Eficiência Energética. Análise 2008, Direcção Geral de Geologia e Energia (coord.), ADENE – Agência para a Inovação (com o apoio de), Fevereiro de 2008, 17 pp.

Portugal Eficiência 2015 – Plano Nacional de Acção para a Eficiência Energética. ANEXOS – Versão para Consulta Pública, Direcção Geral de Geologia e Energia (coord.), ADENE – Agência para a Inovação (com o apoio de), Fevereiro de 2008, 54 pp.

Portugal Eficiência 2015 – Plano Nacional de Acção para a Eficiência Energética. Resolução do Conselho de Ministros N° 80/2008, Direcção Geral de Geologia e Energia (coord.), ADENE – Agência para a Inovação (com o apoio de), Fevereiro de 2008, 19 pp.

Regulamento Específico “Energia”, Ministério da Economia, da Inovação e do Desenvolvimento, Gabinete do Secretário de Estado Adjunto, da Indústria e do Desenvolvimento, Abril de 2011.

Renewable Energy Country Profiles – Final version February 2008, Ecofys, Fraunhofer ISI, EEG, Lithuanian Energy Institute, Seven, Fevereiro de 2008, 168 pp.

Renewable Energy Country Profiles, 2009 version (Within the Intelligent Energy Europe Project – Re-Shapin), Ecofys, Fraunhofer, EEG, Lithuanian Energy Institute, 276 pp.

Renováveis, Estatísticas Rápidas, Direcção Geral de Energia e Geologia, n° 70, Dezembro de 2010, 22 pp.

Tarifas e Preços para a Energia Eléctrica e outros Serviços em 2011, ERSE – Entidade Reguladora dos Serviços Energéticos, Dezembro de 2010, 285 pp.

Uma política de energia com ambição, Ministério da Economia e da Inovação, 88 pp.

INTERVIEWS

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TABLES

Annex Table A – Indicative average tariffs and support periods for RES

Technology	Indicative average tariffs (EUR/MWh)	Coefficient Z	Notes
Wind	74–75	4,6	Paid for 33 GWh/MW or 15 years
Hydro up to 10 MW	75–77	4,5	52 GWh/MW or 20 years. In exceptional cases 25 years.
PV > 5 kW	310–317	35	21 GWh/MW or 15 years
PV ≤ 5 kW	450	52	
Solar thermoelectric ≤ 10 MW	267–273	29,3	
PV microgeneration ≤ 5 kW	470	55	When installed in residential, commercial, services or industrial buildings. 15 years
PV microgeneration > 5 kW and ≤ 150 kW	355	40	
Forestry biomass	107–109	8,2	25 years
Animal biomass	102–104	7,5	
Biogas anaerobic digestion, urban solid waste, wastewater treatment plants, etc.	115–117	9,2	When limits on power installed at National level are achieved, Z becomes 3,8. 15 years
Landfill gás	102–104	7,5	

Technology	Indicative average tariffs (EUR/MWh)	Coefficient Z	Notes
Urban solid waste	53–54	1	15 years
Sorted/prepared urban waste	74–76	3,8	
Waves (Demonstration up to 4 MW)	260	28,4	15 years
Waves (Pre-commercial up to 20 MW)	191	16–22	Factor Z is decided by the government; 16 e 22 depend on the project value.
Waves (Commercial)			Factor Z is decided by the government; the lower and upper limits depend on the project value. 15 years.
first 100 MW	131	8–16	
next 150 MW	101	6–10	
Next	76	4,6	

Source: Decree-Law n. 225/2007