

Advisory Services
May 2009

Green Electricity Making a Difference

An International Survey of Renewable Electricity Labels



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PRICEWATERHOUSECOOPERS 

Preface

Private and corporate electricity consumers suffer from a lack of reliable information about electricity generated from renewable sources. Driven by the goal of increasing transparency in the green electricity market, PricewaterhouseCoopers (PwC) and a multi-stakeholder group have produced this Green Electricity Report. It examines almost twenty renewable electricity labels and the structure of more than thirty national renewable electricity markets.

The report reveals a diverse landscape of renewable electricity labels and identifies potential for improvement. Key improvement areas, which would be particularly appreciated by multi-national corporations, include a global reach of the labels and improved communication efforts.

In order to be able to take into account the diversity of stakeholders and experts in the renewable electricity market, PwC teamed up with a group consisting of staff from Swiss Re, WWF and the “Verein für umweltgerechte Energie” (association for environmentally sound energy, VUE). Thus, the report was created in close cooperation with electricity consumers and relevant experts. A board of experts on this subject matter reviewed the report at different stages and gave valuable advice to the authors.

PwC was able to draw on the expertise of its global sustainability practice. It consists of over 800 sustainability professionals in 50 countries, making PwC the leader in providing sustainability consulting. The sustainability issues arising from the generation of renewable electricity, such as conflicts between environmental, social or economic goals, belong to the core competency of our sustainability practice. We help clients improve their social, environmental and economic performance and create long-term shareholder value, through delivering strategy, governance, performance management, reporting and assurance solutions.

By providing this report, we hope to increase transparency in the market for renewable electricity and to stimulate future developments that are beneficial to all stakeholders.

On behalf of PricewaterhouseCoopers and the group involved in producing this report I would like to express my heartfelt thanks to all those who have supported us and contributed in one way or another to this project.

Thomas Scheiwiller
Partner, PricewaterhouseCoopers Ltd, Switzerland
Global Sustainability Leader

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Executive Summary

There is an ever increasing interest in renewable or green electricity among private and corporate consumers. They are interested in carbon neutrality and have a growing awareness of other ecological problems and sustainability issues. The market for renewable and green electricity has seen considerable changes over recent years. Mandatory and voluntary markets have been established and new market players, products, regulations and instruments (such as Renewable Electricity Certificates) have emerged. These all contribute to the growing complexity of this market. As a consequence of these developments the electricity market has become highly complex, often confusing private and corporate consumers with unclear information, or by not providing information about the electricity they purchase.

Therefore, guidance is needed in the market to help consumers find the appropriate product for their diverse needs. This survey is a first step towards such guidance and aims at creating a basis for decision-making on the procurement of green or renewable electricity. Even though the survey is principally directed towards the needs of private and corporate consumers, it also addresses the roles and responsibilities of producers and resellers, labelling organisations and regulators in the electricity market.

Aim and scope of this report

Three key questions are addressed in this report:

- What are the characteristics of today's national renewable electricity markets?
- How sustainable and credible are labels for renewable electricity?
- What role do labels play in today's renewable electricity market and what future additional contribution could they make?

Key findings

- Labels are the only available tool for identifying renewable electricity produced in accordance with broad sustainability criteria.
- The electricity assessment criteria used by labels across the world are of uneven quality, especially regarding broad sustainability aspects.
- Labels need to improve communication and transparency when it comes to procedures and criteria specific to the product.
- Most labels are local and do not apply across national borders, making it difficult for multinational firms to implement a global sourcing strategy for renewable electricity.
- Governmental promotion of renewable electricity must provide clear definitions and regulations to secure the co-existence of a voluntary market that increases the share of renewable electricity above the regulated minimum.
- Renewable electricity is still a niche product even though investments in recent years have increased in absolute numbers.

The survey consists of four main parts:

- Chapters 1 to 5: Description of the renewable electricity market; discussion of the role of renewable electricity labels; the methodology used to assess the labels; the results of the country survey, label survey and concluding remarks.
- Chapter 6: Country reports which give an overview of the national electricity production, a description of the legal framework and subsidies and also an overview of the different systems available in the country concerning renewable electricity.
- Chapter 7: Label reports that assess the criteria which are applied by the labels and their governance structure.
- Appendix: contains the definitions of terms (such as additionality, green electricity, criteria, label and so on) used in this survey. We want to stress the importance of the definitions as some have slightly different meanings than in other literature.

The outcome of this survey is a comparative analysis of the different labels in the relevant national and international markets as shown in the graph below.

Note on authors and information sources

The survey was created by a multi-stakeholder workgroup, including members of Swiss Re, “Verein für umweltgerechte Energie” (VUE), WWF and PricewaterhouseCoopers (PwC). The report was drawn up by PwC supported by a steering group of external experts.

The information presented in this survey is mainly based on publicly available information. As renewable electricity labels operate in a complex environment, various sources were considered. However, due to fragmented data sources and often limited quality of data provided on the Internet, the information presented in this survey might not be complete or accurate in all details. It must therefore be noted that this survey is not a scientific work.

The information presented in this survey is, with some exceptions, as of late Autumn 2008. Whilst considerable care has been taken to ensure the accuracy of the survey, PwC would be pleased to hear of any errors or omissions, together with the source of the information.

Category	Criteria		Bra Miljöval (SE)	EcoLogo (CA)	100% energia verde (IT)	EVE - Electricité Verte (FR)	Green-e (US)	Green Power Certification System (JP)	GreenPower (AU)	Grüner Strom Label (DE)	Milieukeur Groene Elektriciteit (NL)	naturemade basic (CH)	naturemade star (CH)	Norppaenergia (FI)	ok-power (DE)	Power Scorecard (US)	TÜV SÜD EE01 (DE)	TÜV SÜD EE02 (DE)	TÜV SÜD Generation EE+ (DE)	TÜV SÜD Generation EE (DE)	Umweltzeichen (AT)
Ecological criteria	1	Hydro-electricity: minimum flow regulations																			
	2	Hydro-electricity: hydro peaking																			
	3	Hydro-electricity: reservoir management																			
	4	Hydro-electricity: bed load management																			

1 The renewable electricity market

1.1 Renewable electricity production expected to increase significantly

There has been a surge in expectations that a diverse range of power generation methods – such as wind, solar or geothermal energy, combined heat and power and other forms – will have a significant impact on future electricity markets.

According to the Renewables 2007 Global Status Report of the Renewable Energy Network for the 21st Century (REN21) the share of renewable energy sources in global electricity generation excluding large hydropower plants was 3.4% in 2006. Furthermore, large hydropower plants accounted for 15% of global electricity production in the same period. This adds up to a total share for renewable electricity production of 18.4% of the global electricity production.

The World Energy Outlook 2008 (WEO 2008) of the International Energy Agency (IEA) states that the proportion of non-hydro renewable energy sources for global electricity production – wind, solar, geothermal, wave and tidal energy – is growing the quickest, but the proportion is still small. It is expected that the proportion of non-hydro renewable energy sources in global power generation increases from 1% in 2006 up to 4% in 2030.

Focus on clean power – a key development in the electricity market

In the Utilities global survey 2008 conducted by PwC, the encouragement of renewable energy topped the list of key developments that respondents expected to see in their power markets in the coming years. The focus on clean power and the associated concerns of emission regulations and energy efficiency top the agenda of utility company survey respondents in every major power market. Today's strong emphasis on environmental issues amongst respondents to the survey manifests a trend that already became evident in the 2004 edition and that has been corroborated in recent years.

Renewable does not always equal sustainable

The shift from non-renewable to renewable energy sources for electricity production is seen as a way to sustainably preserve valuable resources for future generations. What remains unclear to many consumers is that electricity generation from renewable energy sources is not free from negative environmental impacts: hydropower generation can for example have severe negative impacts on regional irrigation, local humidity and cultural and societal structures; or wind energy can impact bird flight paths and is perceived as negatively impacting country landscapes. It is therefore important to be able to distinguish not only between electricity production that uses renewable or non-renewable sources, but also to identify other characteristics of the production process that may impair the environment or society, directly or indirectly. Therefore clear guidance in the form of a transparent and comprehensive multi-criteria approach to electricity generation is a key factor to enable the consumer to assess whether the renewable electricity is sustainable or not.

1.2 Key players and complexity of the market

- **Consumers (private and corporate).** Consumers are one of the main drivers of the renewable electricity market and have the power to further develop it. However, they require instruments to identify and assess the electricity available on the market to support their buying decision. They are willing to pay a certain price premium for renewable or green¹ electricity, but are price sensitive. Above all they want to know what they pay the premium for. The lack of transparency and availability of information regarding the quality of green tariffs for electricity waters down the consumer's choice. Hence the resulting frustration among consumers might lead to a reconsideration of the initial willingness to buy renewable or green energy.
- **Producers and resellers.** These groups offer new products to meet consumers' requirements as the demand for renewable and green electricity grows. However, these products are mostly targeted at only the local or national market. There are still numerous countries on all continents that do not have any green electricity market. This market potential has not yet been exploited. Producers should further develop renewable electricity markets with credible offers that legitimate the price mark-up on their products.

¹ To simplify matters, this study uses the terms "renewable" or "green" electricity as equivalents, even though some sources suggest differentiation should be made between simple electricity generated from renewable sources ("renewable electricity") and the renewable electricity product that fulfils various criteria and is balanced by a Life Cycle Assessment ("green electricity") (for definitions see appendix 8.3).

- **Regulators.** These have the power to further develop the renewable electricity market by introducing favourable regulations. However, they have to assess the effects of renewable electricity in its local, regional, national or global context in a critical and unbiased manner. Renewable electricity can have significant adverse impacts on nature, society or the economy and can be subject to conflict of interests. Promotion of renewable electricity should be accompanied by broad sustainability criteria that follow a holistic perspective. Regulators should ensure that mandatory schemes to promote renewable electricity do not constrain any voluntary market but rather increase the share of renewable electricity over and above government mandates.

Complexity of the renewable electricity market

The renewable electricity market varies strongly in different regions of the world. While it is almost non-existent in some regions of the world (such as Africa, Asia or South America), markets are becoming increasingly complex and regulated in others (most notably Europe and the US). On top of this, these markets are changing at a very fast pace. These changes have different drivers, which can be categorised into those driven by regulations (mandatory) or those driven by voluntary consumer initiatives. Regulatory changes are created at regional, national and international level and by varying sources such as regional water or landscape protection policies², national and international deregulation efforts in electricity markets³ or supranational targets for fighting negative effects of climate change (cf. excursus below).

² The water and landscape protection regulations deal with the negative effects of renewable electricity generation, which are further discussed in chapter 2.2.

³ See, for example the deregulation of the electricity markets by European Directive 2001/77/EC that allows transnational trade in electricity, bringing along issues about the Guarantee of Origin, which is further described in the appendix 8.1.

Minimal requirements for a functioning renewable electricity market

When analysing renewable electricity markets that function well for end-consumers, two minimal requirements become apparent: First, there are clear regulations for the respective national renewable electricity markets and the markets that are closely linked to them (such as the market for RECs, see excursus). The regulations and the instruments are carefully defined such that the consumers are aware of the attributes incorporated in the mandatory instruments (such as RECs). Second, the renewable electricity markets feature strong labels which serve as reliable identifiers for consumers in the non-regulated, voluntary electricity market to assess the characteristics of renewable or green electricity and ensure the desired quality and value.

Whilst the importance of clear and coherent regulations for the renewable electricity market is stressed, this report will concentrate on renewable electricity labels. Hence this report analyses the holistic approach of the labels to assess renewable electricity and discusses the present and future role of the labels in the renewable electricity market.

Excursus: Renewable electricity and reporting on CO₂ emissions – subject of debate

There is a high interdependence between renewable electricity and the climate change discussion: efforts to fight the negative impacts of climate change have led to a broad range of regulations on both national and international level that mainly aim at tackling the problem of reducing greenhouse gases (GHGs). This has led to the creation of mandatory markets for CO₂ reduction certificates. Beside the mandatory markets voluntary markets also exist for consumers that want to reduce negative impacts on the climate.

In the course of the climate change discussion in recent years many companies have started to address the expectations entertained by stakeholders, such as employees or potential new hires, environmental groups or shareholders, with respect to climate change. Many companies have announced voluntary targets to reduce their carbon footprints (for definitions see appendix 8.2), often setting targets for direct emissions (from own operations) and indirect emissions (mainly purchased electricity).

A common framework to reduce a company's CO₂ emissions consists of four pillars:

- 1) Energy efficiency improvement through behaviour, process and infrastructure improvement;
- 2) On-site renewable energy generation;
- 3) Purchase of low carbon energy;
- 4) Compensation via carbon off-set certificates.

The second and third pillars require clear rules for accounting for the reduction in CO₂ emissions due to generating electricity from renewable sources. Substitution via purchasing low-carbon energy can be done by buying trading certificates, 'green-tariffs' or labelled electricity products. However, only the purchase of a certified product can provide assurance that the reduction⁴ in CO₂ emissions can be accounted for in the books of the purchasing company. Failing to secure the CO₂ reductions for the purchaser weakens customers' willingness to pay a higher price for green tariffs or to invest in on site generation of renewable electricity.

Voluntary reporting

Companies wishing to set GHG emission targets and monitor progress against these targets need to be able to track and report emission levels. As GHG emissions are difficult to measure directly, they are normally calculated using conversion factors. Discussion of the accurate choice of conversion factors or calculation methods is not in the scope of this report. We would like to concentrate on discussing how to account for the use of renewable electricity in the company's GHG reporting.

The Greenhouse Gas Protocol ('Protocol'), a widely accepted guideline on how to report on a company's GHG emissions, expects the companies to include indirect emissions associated with the consumption of purchased electricity company accounting and reporting under the GHG Protocol Corporate Accounting and Reporting Standard. Furthermore the Pro-

tol explicitly mentions that one strategy to reduce emissions is to purchase renewable electricity to reduce the GHG intensity of the electricity consumed. Companies following this strategy are allowed to report on these GHG emissions by applying conversion factors applicable to the respective renewable energy source (such as solar, wind or hydro) or to apply the conversion factor provided by the producer or supplier.

Another voluntary reporting standard, the Global Reporting Initiative (GRI), supports and advises companies in reporting on GHG emissions by applying the electricity specific conversion factors. It suggests that companies meet GHG emission reduction objectives by purchasing renewable energy and applying the associated electricity specific conversion factors to report on the resulting emissions.

The new ISO 14064 standards on GHG accounting and verification do not contradict this method of calculating and reporting on GHG emissions, as they also refer to the Protocol.

Despite this variety of guidelines, in reality there is often a lack of transparency concerning which party (the electricity producer or the consumer) is allowed to claim the credit for the GHG emission reduction through the generation of electricity from renewable energy sources (see the example of the UK in the box at the end of chapter). Companies often face the problem that they do not know if the RECs they buy authorise them to account for the assumed CO₂ reduction. The buyer of RECs provides financial assistance to renewable electricity production in the form of a production subsidy. This does not however guarantee the ownership of the potential CO₂ emission reduction as the producer or reseller of the RECs may sell the CO₂ emission reduction in another market.

Due to the lack of standardisation and regulation with respect to RECs the buyer of renewable electricity needs to clarify on a case-to-case basis if the acquisition also includes the CO₂ emission reduction. Neither certification nor labelling can guarantee this so far.

This lack of transparency gives no incentive to companies to source electricity consumption from renewable sources. This could be avoided if the renewable electricity markets were more clearly defined, a task which is the responsibility of the regulators.

⁴ The acquisition of renewable electricity reduces a company's individual carbon footprint but does not necessarily reduce GHG emissions on a global level. If renewable electricity were to reduce carbon emissions, electricity that is produced from fossil sources would have to be substituted with renewable electricity. In reality, this would for example mean shutting down a coal-fired power plant and replacing it with a wind park. In contrast, if a new hydropower plant is connected to the grid without shutting down a power plant using fossil energy, the country's carbon emissions stay the same. As long as this cannot be guaranteed the term to use is avoidance rather than reduction of GHG emissions. Nevertheless, this report does not distinguish between the two terms to keep the terminology simple.

Who gets the credit for GHG emission reductions? – The situation in the UK

This section deals with the current situation in the UK, using it as an example to demonstrate how complicated corporate reporting issues concerning renewable electricity can be in relation to regulatory targets and voluntary GHG emission reduction efforts.

Electricity suppliers in the UK are legally obliged to produce a certain amount of renewable electricity through Renewable Obligation Certificates (ROC). Currently, green products sold in the market are based on ROCs. As best practice the Department for Environment, Food and Rural Affairs (Defra) recommends using the average electricity grid conversion factor to calculate the CO₂ emissions resulting from electricity consumption. This is in line with the UK Government's methodology for calculating its GHG emissions as well as with the requirement of the upcoming Carbon Reduction Commitment (CRC). However, if the electricity producers generate more renewable electricity than the legally defined minimum, they should be able to sell this "excess supply" of renewable electricity, including its attributes. Under the current legal framework this is not the case.

In its Guidelines to Defra's Greenhouse Gas Conversion Factors for Company Reporting as of June 2008, Defra states that the conversion factors it issues are for voluntary estimating and reporting of GHG emissions. As a consequence, consumers purchasing green electricity tariffs should no longer be accounting for the reduction in CO₂ emissions caused by renewable electricity, meaning that the purchase of renewable electricity has become useless in relation to voluntary GHG emission targets.

Nevertheless, Defra acknowledges that renewable or green electricity might have environmental benefits and lead to additional carbon reductions in the long run. Defra is in a clarification process with different stakeholders on how to account for these benefits in future GHG reporting.

It is likely the number of companies in the UK that voluntarily buy renewable electricity will decrease given the financial pressures arising from applying an average grid mix conversion factor. This would cause a new hurdle on the path to promoting renewable electricity. Discussions on how to deal with the issue are ongoing and no final comment can be given at this point of time. Companies with operations in the UK will need to follow developments closely.

Upcoming regulations on Carbon Disclosure (regulatory mandated), which are currently in consultation under CRC, could further increase the complexity of voluntary activities and voluntary carbon commitment.

A label in this market offering a truly additional (also to the regulatory obligations) GHG emission reduction would provide customers wishing to pursue voluntary GHG abatement the required instrument. In this case, only renewable electricity that is generated over and above the regulatory amount would be certified as it is the case in other markets, such as Germany or Switzerland.

2 Renewable electricity labels

Given the complex and diverse structures in the different national renewable electricity markets, the questions of sustainable characteristics, universally applicable definitions and the origin of energy products are gaining in importance. However, as renewable electricity generation might also have adverse impacts on the environment or on communities, a transparent and comprehensive multi-criteria approach is vital to enable the consumer to assess whether the renewable electricity was generated in a sustainable manner or not. Therefore, clear guidance in the renewable electricity market is crucial – this is the role played by renewable electricity labels, as will be discussed in the first part of this chapter.

The second part of this chapter raises some issues about what a good label should address in its assessment of renewable electricity like the willingness of consumers to pay a mark-up for renewable electricity. The mark-up depends on transparent information about standards and procedures and on the sustainable attributes (like reduced CO₂ emissions) of the labelled renewable electricity they purchase.

2.1 The role of renewable electricity labels as identifiers

In this report, only labels fulfilling the criteria in the ISO requirements for “Environmental labels or eco-labelling” (Type I) have been accepted as labels. Labelling organisations are enablers providing identifiers for assessing the characteristics of renewable electricity in voluntary transactions in renewable electricity markets. Currently, the different quality aspects (such as production quality criteria or ecological standards) are only defined by labels whereas trading systems (for definitions see appendix 8.3) only define the (renewable) origin of the electricity per kWh and do not assess its ecological quality.

Additional sustainable quality criteria (for definitions see appendix 8.3) are important market differentiators for a label or an electricity product in contrast to those for normal national electricity production from renewables. Therefore, it is important that regulations for green electricity market labels are well defined, so that labels can properly define the additional sustainable value of the labelled product against a clear national baseline. The baseline is legal compliance with the regulations of the country where the service is provided. Nevertheless, labels are continuously challenged to reflect the strongly changing regulatory frameworks nationally and internationally. Labels will need to adapt procedures and characteristics to ensure that the additional value is maintained.

Labels are therefore an important means of ensuring that the electricity purchased is not only based on renewables but is also measured against additional and credible sustainability criteria. Labels enable electricity generators, distributors and consumers to identify and assess the electrical energy available on the market and thereby facilitate their buying decision.

Note, however, that each labelling system has its own range of criteria; thus a label guarantees a specific quality based on self-defined criteria and is not necessarily comparable with other labels. As a consequence, consumers need to have full transparency about the quality of the label. This includes information about the multi-criteria approach applied and the procedures in place.

Future needs – global availability of labelled renewable electricity

A global label for renewable electricity does not exist today; yet for consumers (especially internationally operating companies) it would be preferable to have labels with a world-wide reach, as gaining an overview on each national renewable electricity market and products is a time-consuming task. Today, consumers are often left frustrated when trying to pursue their intention of implementing a global sourcing strategy for renewable electricity, as the lack of a consistent global coverage of a label makes reporting on its environmental performance a difficult task.

Despite the legitimate demand from international companies for such a global solution, it is currently impossible to purchase labelled electricity that meets consistent evaluation criteria in each country of operation. It is not even possible to find electricity suppliers or labels that can fulfil this demand on more than a regional scale, as most of the labelling systems tend to concentrate on a local criteria for production, promotion and markets.

During the research for this survey, no indication was found that such a global system is planned or being developed. A European initiative for the harmonisation of green electricity labels in Europe, called European Green Electricity Network (EUGENE), was stopped early in 2009. The reasons were that established labels had already tailored their products to national electricity markets and the needs and expectations of their consumers, making it very difficult to change the criteria for customers who are already under contract. A new approach to harmonisation, however, similar to The Gold Standard for carbon offset projects, FSC-label for forestry or MSC-label for fishery, could be a possible option.

2.2 Issues to be addressed by renewable electricity labels

Besides the need for standardisation of the labelling approach to simplify electricity sourcing for corporate consumers, it is crucial that labels assess renewable electricity from a holistic perspective. The main problem for consumers wishing to understand the characteristics of the electricity they purchase is that different labels (not to mention all the electricity products or green tariffs) take different additional sustainability aspects into consideration. For customers to be willing to buy labelled green electricity and pay a surcharge for it, two main requirements need to be met by labels:

- Providing added value via sustainability criteria: The electricity is generated from renewable sources and fulfils additional sustainability criteria.
- Ensuring the credibility of the label via appropriate procedures: Such procedures should include appropriate organisation of and professionalism of the label, including independent audits, a disclosed methodology for “balancing” the electricity provided under the label and high transparency.

Sustainability criteria

In accordance with the idea of the triple bottom line of sustainability, consumers are interested not only in the environmental but also the social and economic impacts of the electricity produced.

Ecological criteria considered by consumers

- The potentially negative impacts of a hydropower plant on other water users. Many ecosystems and economic demands compete for water: drinking water, irrigation of farm land, habitat for fish and other aquatic life, and so on. The potentially negative impacts from hydroelectricity include disrupting river flow, stranding aquatic organisms, trapping sediments, and emitting toxic lubricants.

- The life cycle impact (for definitions see appendix 8.2) of renewable power plants (wind, photovoltaics, geothermal energy, tidal energy, and waste), the minimum required efficiency level of the plant, and the flow-on effects from the plants. Example flow-on effects are landscape impacts of wind turbines and ammoniac emissions from biomass plants.
- The exclusion of non-renewable energy sources.
- Support schemes provided by the label to increase electricity production from renewable energy sources.

Social and economical criteria considered by consumers

- The idea that arable land used for the production of biomass for a biomass power plant would be better used for food production.
- The impacts of the electricity production chain on soil fertility, sustainable land use, use of genetically modified organisms, and biodiversity. An example of high impacts caused by the supply chain for a green electricity power plant is generating electricity from palm oil. Palm oil can be produced in intensive monoculture, in former rain forest areas. This can drastically reduce soil fertility.
- The system for tracking the source of biomass. Usually traded biomass passes through numerous hands. A special tracking system should be established to record the whole process from production to consumption. This would help to ensure that the above criterion concerning sustainable biomass farming for electricity production can be met.
- The social aspects of dam building projects. Large dam building projects have many societal impacts, such as whether the needs of local people were respected, if they shared the benefits of the dam project, if it was constructed in accordance with local laws, and if boundary issues were respected.
- The corporate social responsibility efforts of the electricity producer, such as employing local staff at fair wages, having an environmental management system and contributing positively to the local community.
- Creation of economic benefits through the production of renewable electricity.

Process criteria

Organisational and professional criteria considered by consumers

- The credibility of the label and its management. Labels which are run by organisations including representatives of the energy industry, consumer organisations and environmental organisations can be considered as highly credible. A balanced voting weight among energy industry, consumer and environmental organisations can be beneficial for a label.
- Legal compliance on the part of the electricity producer and of the agreement between the producer and the labelling organisation.
- Regular audits of the label by an independent third party.
- The length of time for which an electricity source is determined to have met the label's requirements before requiring recertification.

Balancing criteria considered by consumers

- The ability of the label to trace the electricity back to its origin, such as through the existence of "Guarantee of Origin" schemes (for definitions see appendix 8.2). Tracing the source of electricity is important to consumers, as they can then choose the energy source and the region, or even the plant, where the electricity comes from. Traceability of each kWh of electricity back to the generating facility should be inherent in a label.
- Avoiding double counting of the added value of labelled electricity. The consumer must be sure that the added value paid for via a label is not sold more than once. The label organisation should be able to guarantee that the labelled electricity produced exceeds, or at least is equal to, the labelled electricity sold.
- Restrictions of deficits in supply of certified renewable electricity a label imposes on electricity producers.
- Treatment of green electricity used/lost by the electricity generator, such as through own electricity consumption and transfer losses.
- The label's use of Life Cycle Assessment (LCA) to assess the global impact of an electricity production plant.

Transparency criteria considered by consumers

- Availability of information on the added value of the label and the degree to which consumers can choose the type of electricity they prefer.
- Clarity of communication of the label's criteria. Consumers must be helped to identify the added value provided by purchasing labelled electricity. This information needs to be promoted actively, be easily available and easy to understand.
- The degree to which the label protects consumers' rights.

3 Methodology

3.1 Approach

This survey is based on research conducted between June 2008 and November 2008. 34 countries in Europe, the Americas, Asia Pacific, Middle East and Africa were included in the survey. Selection criteria for countries were market maturity, geographical coverage and economical power. Some countries (such as Pakistan, Afghanistan, Kenya, the U.A.E or Saudi-Arabia) had to be excluded due to the paucity of the required information. Half of the 34 countries surveyed are in Europe, reflecting the maturity of renewable electricity policies and markets in Europe as well as the availability of information.

Region	Total	Country
Africa	1	South Africa
America	7	Argentina, Brazil, Canada, Chile, Mexico, Uruguay, USA
Asia	7	China, Hong Kong, India, Indonesia, Japan, Philippines, Singapore
Europe	17	Austria, Belgium, Denmark, Finland, France, Germany, Hungary, Ireland, Italy, Netherlands, Poland, Portugal, Spain, Sweden, Switzerland, Turkey, UK
Oceania	2	Australia, New Zealand

Table 1: Overview of countries surveyed

While analysing these national renewable electricity markets, those labels that fulfilled the ISO requirements for “Environmental labels or eco-labelling (Type I)” were identified and included in this survey.

The map below gives a graphical overview of the countries and labels that were part of the study.

3.2 Assessing national renewable electricity markets

Two sources of information were used to assess the national renewable electricity markets considered in the survey. First, for each country a break-down was made of the total gross electricity production by source (such as coal, gas, or renewables) in 2007⁶. The proportion of renewable electricity was then further broken down into the types of renewable sources used. In order to ensure data were comparable, official IEA data was used for those countries where information was available. For countries where no IEA⁷ data was available, public data was used.

Secondly, a survey approach was used to capture information on the national electricity frameworks and renewable electricity systems. A detailed survey was sent to, and filled in, by PwC professionals in the countries where the survey took place, requesting information on the following:

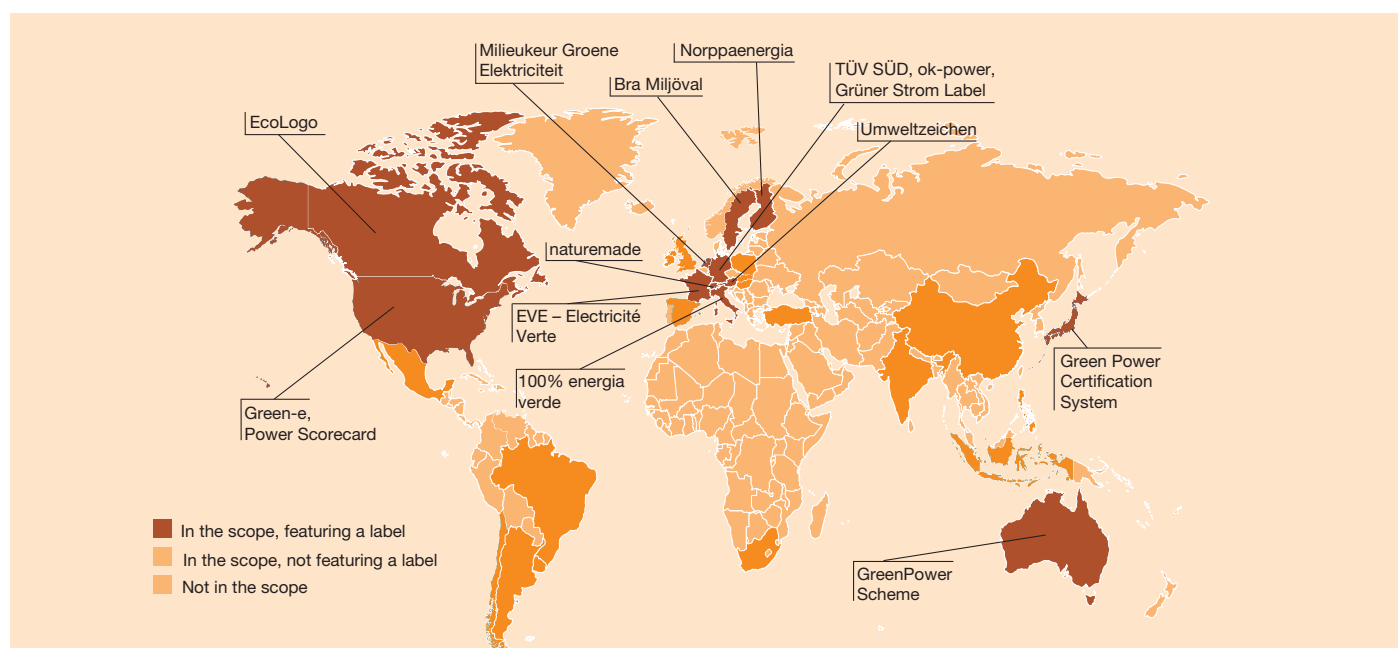


Figure 1: World map indicating countries surveyed and origins of included labels (Source: PwC)

- National legal framework for renewable electricity; includes sources and references for further information, as well as a brief description of the national electricity market.
- Overview of all systems available in the country to assess the characteristics of green electricity for sale. The following information was requested:
 - Whether a declaration system existed: A declaration system is a minimum requirement for identifying green electricity products.
 - Whether a renewables trading system (redeeming system) was in place.
 - Whether there was a tracking system, or guarantee of origin system, which ensures the traceability of the electricity and the sources.
 - Whether there were any labels in the electricity market that fulfilled the ISO requirements for “Environmental labels or eco-labelling (Type I)”: this was to identify labels for the second part of the study.

3.3 Assessing the sustainability and credibility of labels

For those countries where the first survey identified electricity labels that fulfilled the ISO requirements for “Environmental labels or eco-labelling (Type I)”, a second survey was sent to the PwC professionals for completion. This second questionnaire concentrated on more detailed information concerning green electricity labels in the countries, such as certification criteria, quality of the labelling procedure and credibility of the label.

In addition to the PwC professionals in the countries involved, a second questionnaire was also sent to the label organisations concerned with the request to fill in the required information. This double-track approach guaranteed the most objective results possible by increasing the scope of the survey. However, in total only three label organisations returned the completed survey.

The label survey requested information on the labelling system in general and an assessment of the label against

27 defined criteria. As indicated in chapter 2.2, these criteria were divided into two main categories:

- Sustainability criteria: Such refer to the impacts electricity generation has on environmental and societal issues.
- Procedure criteria: These assess the methods and processes that ensure the content of the label.

Each label was rated against the 27 criteria using four categories: none, low, medium, high. It must however be stressed that even though the graphs give a rough idea of the overall quality of a label, the purpose is not to establish a ranking but rather to provide help to the potential consumer to find the label that matches his preferences best. For example, a potential consumer that finds ecological criteria much more important than process criteria should choose a label that scores high for ecological criteria.

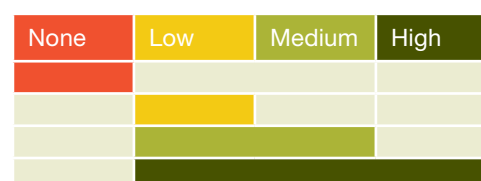


Figure 2: Example for the ranking methodology applied in this survey (source: PwC)

Even though much effort has been put into an objective rating procedure, to a large extent the label assessment is also based on professional judgement. It must be stressed that the assessment of the sustainability criteria evaluated whether the labels provided additional criteria with respect to the national baseline. Therefore, the assessment of the labels has to be seen in the context of the respective countries' regulations. This again underlines the fact that the label assessment in this survey is not useful for ranking purposes. In this sense, the classification “None” means:

- The label does not have the criterion in place; OR
- There was no publicly available information that would have served as a basis for a higher evaluation; OR
- The country in which the label provides its service already has legal requirements that this criterion needs to fulfil.

The analysis framework for photovoltaic electricity is described as an example of how the assessment worked:

- If a label did not have any additional ecological criteria regarding photovoltaic it received the rating, “None”.

⁶ The overview of the national electricity market is about electricity production, as data on consumption was not available at the time the survey was conducted.

⁷ At the time of the research, only values of the year 2007 were available. The final numbers of the year 2008 will be published by the IEA in June 2009.

- If a label had any additional ecological criteria regarding photovoltaic, such as for example only “protection of the landscape”, it was at least rated as “Low”.
- If a label had several additional ecological criteria regarding photovoltaic, such as “protection of the landscape” and “consideration of land use aspects”, it was rated as “Medium”.

- If a label had a detailed catalogue of additional ecological criteria regarding photovoltaic, such as “protection of the landscape”, “consideration of land use aspects”, “criteria regarding the efficiency of the power plant” and “threshold values for the maximum global impact”, it was rated as “High”.

An example of a label graph can be found below.

Sustainability criteria – label: Example

Category	Criteria	None	Low	Medium	High
Ecological criteria	1 Hydroelectricity: minimum flow regulations				
	2 Hydroelectricity: hydro peaking				
	3 Hydroelectricity: reservoir management				
	4 Hydroelectricity: bed load management				
	5 Hydroelectricity: power plant design				
	6 Hydroelectricity: ecological improvement fund				
	7 Hydroelectricity: equal treatment of all sizes of power plants				
	8 Electricity from wind				
	9 Electricity from photovoltaics				
	10 Electricity from biomass				
	11 Electricity from geothermal energy and tidal power plants				
	12 Electricity from waste				
	13 Exclusion of non-renewable electricity				
	14 Quality of renewables support scheme				
Social and economical criteria	15 No rivalry between electricity generation and food cultivation				
	16 Securing soil fertility and land use				
	17 Biomass tracking				
	18 Social criteria for dam building projects				
	19 Corporate social responsibility of electricity producer				
	20 Market share				

Process criteria – label: Example

Category	Criteria	None	Low	Medium	High
Organisation and professionalism	1 Representation of industry				
	2 Representation of pressure groups				
	3 Guarantee of legal compliance				
	4 Audit by independent third party				
	5 Periodical revaluation of certification				
Balancing	6 Declaration of origin				
	7 Avoidance of double counting				
	8 Regulation for deficit in supply				
	9 Only net energy permitted				
	10 LCA verification				
Transparency	11 Availability of information on electricity quality				
	12 Communication and availability of criteria				
	13 Protection of consumer rights				

Figure 3: Example of the label graph used in the survey to assess the labels, showing the two main categories sustainability and process criteria and the respective subcategories (Source: PwC). For a more detailed description of each criterion please refer to appendix 8.3

Sustainability criteria

Sustainability criteria are divided into two subcategories that reflect the triple bottom line of sustainability, whereby the ecological criteria form one subcategory, social and economical criteria are combined in the second subcategory.

Half the “ecological criteria” (1-14) assess aspects of hydroelectricity as hydropower accounts for the lion’s share (76%) of renewable electricity in the countries included in this report. The basics for the assessment of these categories were taken from the “greenhydro” standard. Two further criteria (6 and 7) cover ecological investment schemes related to hydroelectricity and the rules for producers with respect to size. Criteria 8-12 analyse the ecological standards for other renewable electricity sources. Criterion 13 reflects a binary choice about the exclusion of electricity produced with fossil energy sources. The last ecological criterion (14) evaluates the effectiveness of support for promoting electricity generation from renewable sources.

Criteria 15-20 address the social and economical sustainability aspects. The first three (15-17) evaluate negative impacts that can result from producing electricity from biomass, such as the recent discussions about bio-fuels triggering rising maize prices and leading to food scarcity in developing countries. Other social aspects are considered by criteria 18-19, which evaluate the working conditions and the protection of cultural assets and – in the case of hydroelectric energy generation – dam building aspects. Finally, criterion 20 looks at the market share of the label which is used as a proxy for economical sustainability.

Procedure criteria

Procedure criteria ensure the label can credibly convince consumers that the stated sustainability criteria, for which the consumer is paying a premium over normal electricity products, are actually being met. Analysis of the procedural criteria was organised into the three subcategories “organisation and professionalism”, “balancing” and “transparency”.

The topic “organisation and professionalism” (criteria 1-5) includes information on the independence of the labelling body (separation of powers), the constitution of the labelling organisation and its relationship to pressure groups and the branch.

The subgroup “balancing” (criteria 6-10) concentrates on the equalisation of certified electricity generation and certified electricity sales (avoidance of double counting), reliability of the balancing, turnover and the public awareness of the label.

It also describes the rules for compensation of a deficit in supply as well as the availability and the quality of Life Cycle Assessment (LCA).

“Transparency” is the third subcategory (criteria 11-13). It investigates the availability and the communication of information for the end consumer and the protection of consumers’ rights.

Comments on process of gathering data and information quality

Note that the country and label surveys were filled in based on publicly available information. No interviews were conducted. As in some cases the information was not accessible or available (such as mix of consumed electricity) there might be some inconsistencies or some information missing. The authors are fully aware of the fact that this study does not provide a complete picture. However, efforts were made to ensure the information provided was reliable.

In order to obtain an additional level of expertise, a steering group⁹ was set up to support the project team. All the members of the steering group possess broad experience in the international and national energy market and labelling of green electricity or trading systems and could thus provide valuable input and guidance throughout the project. The steering group was involved at two stages of the project: First, it provided feedback on the evaluation method used for the survey results and second, it assessed and reviewed the final report.

⁹ For a list of the members of the steering group, please refer to chapter 9

4 Results

This chapter sets out the detailed results of the two surveys conducted. The first survey was directed at assessing national renewable electricity markets, while the second survey concentrated on the labels as a key aspect of the voluntary market and assessed the sustainability and credibility of labels.

Additional general comments on the findings from the surveys as well as on the contribution of electricity labels towards sustainable resource management and transparency in renewable electricity markets are given in chapter 5.

4.1 Results of the assessment of national renewable electricity markets

National electricity production

The national electricity production results show that renewable electricity generally comprises a very small proportion of

total national electricity production. This can be seen in the graph below, which shows the electricity production of the countries in the survey, split into non-renewable electricity sources (fossil, nuclear, other non-renewables) and renewable electricity sources.

Overall electricity production in all countries is still heavily based on fossil fuel. Apart from Austria, Canada, New Zealand, Sweden and Switzerland, renewable energy sources for electricity generation still only play a subordinate role. Renewable electricity production, excluding hydropower, remains below 5% in most countries. France's supportive attitude towards nuclear based energy production is reflected in the graph: It is the country with the highest relative share of nuclear based electricity production.

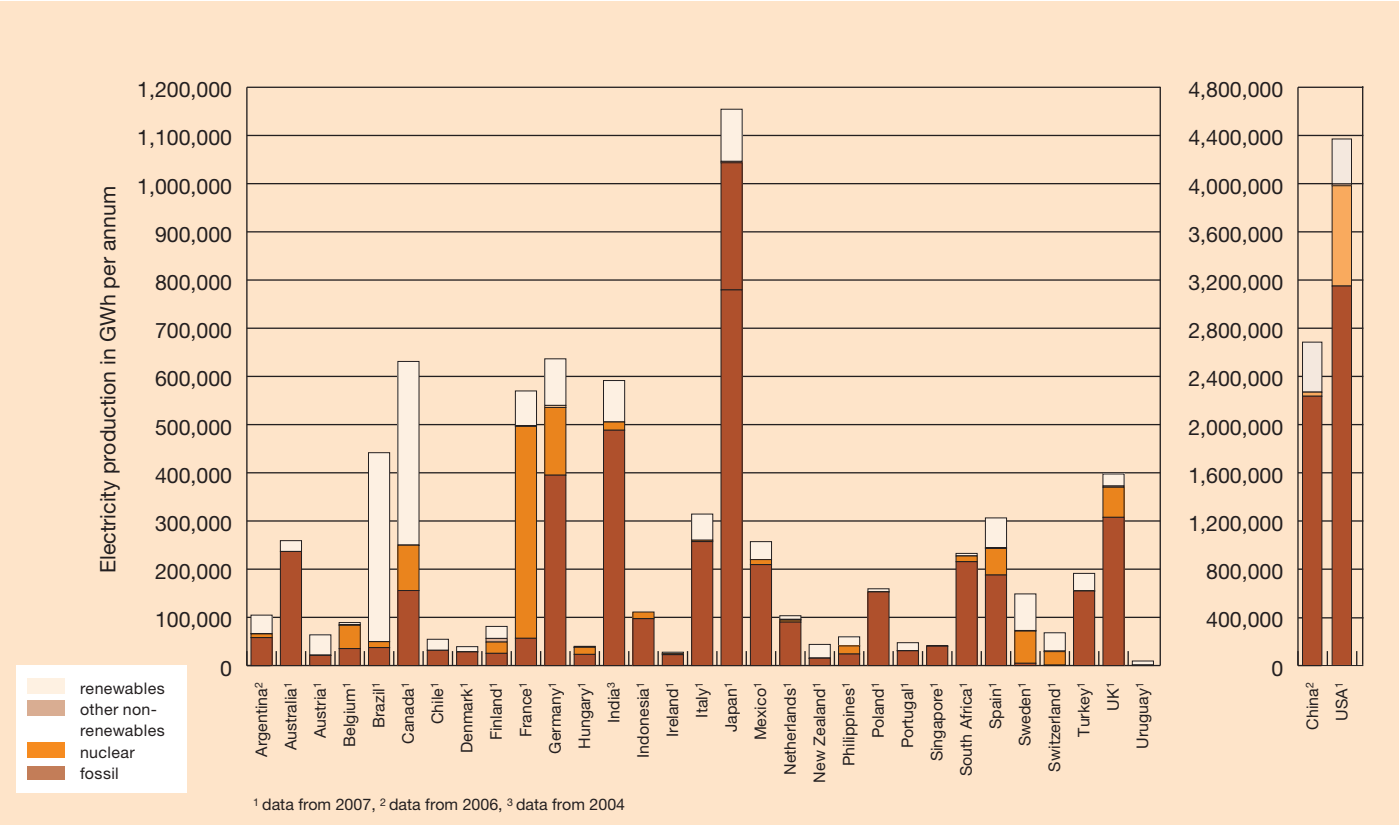


Figure 4: Sources of electricity production of surveyed countries (Data sources: see respective country reports in chapter 6)

National legal framework and financial support from the government

The survey found that all countries surveyed, except Hong Kong, have a legal framework regulating the electricity market. Financial support from the government for renewable energy, through subsidies, funds, grants or tax exemptions, was provided in nearly two-thirds of the surveyed countries. The table below shows all 22 countries that provide financial incentives:

Region	Surveyed countries providing financial support for renewable electricity
Africa	South Africa
America	Argentina, Brazil, Canada, Mexico, USA
Asia	Philippines, Singapore
Europe	Austria, Belgium, Denmark, France, Germany, Hungary, Ireland, Netherlands, Portugal, Spain, Switzerland, Turkey, UK
Oceania	Australia

Table 2: Countries surveyed that provide financial incentives to support renewable electricity. For additional details see country reports in chapter 6.

This result shows that policies to promote renewable energy are becoming common, a finding which corresponds to the results of REN21 in the 2007 Global Status Report. REN21 found that 60 countries – 37 developed and transition countries and 23 developing countries – have some type of policy to promote renewable power generation. The most popular incentive instruments are special feed-in tariffs for renewable electricity. The number of countries enacting such a policy measure has increased significantly over recent years.

Another common political instrument is setting a target for electricity producers to generate a certain percentage from renewables. Financial market instruments on the other hand, such as capital investments or innovative financing, are not widely used.

Regarding target setting, some countries not only set national but also regional targets. Targets are often specifically allocated to the different renewable technologies (wind power, photovoltaic, solar and so on). Some countries have set ambitious goals to significantly increase renewable energy generation capacity within the next twenty to thirty years.

National electricity systems and labels

To increase the market share of renewable electricity, renewables are promoted by governments through government incentives to motivate a growing number of consumers to switch to renewable electricity. Declaration, trading, tracking and labelling systems are important tools for assisting electricity producers and consumers to achieve goals for renewables. These systems provide reliable information on the source of electricity (declaration and tracking), on other characteristics of the electricity (labelling), and allow it to be traded (trading).

Note that even if there is a labelling system in place, a declaration or a tracking system is not needed as the label organisation could provide these services and information.

An overview of the answers given regarding the systems in place is provided in the table below.

Region	Country	Declaration system ¹⁰	Trading system ¹¹ (redeeming system)	Tracking system ¹² Guarantee of Origin	Labelling system ¹³
Africa	South Africa		x	x	
America	Argentina			x	
	Brazil			x	
	Canada		x		EcoLogo
	Chile	x			

¹⁰ The declaration system gives the consumer information about the consistence of the delivered electricity mix.

¹¹ Trading systems are database systems, which facilitate merchandising of electricity. In Europe the Renewable Energy Certification System (RECS) is a well known trading system. See appendix 8.1.

¹² The tracking system refers to the production of electricity and declares the origin of the electricity and the corresponding energy source.

¹³ In this survey a label, i.e. a label for electricity, is understood to conform to ISO standard Type I.

Region	Country	Declara- tion system ¹⁰	Trading system ¹¹ (redeeming system)	Tracking system ¹² Guarantee of Origin	Labelling system ¹³
America	Mexico			x	
	Uruguay			x	
	USA	x	x	x	Power Scorecard, Green-e
Asia	China		x		Jade Electricity
	Hong Kong				
	India		x	x	
	Indonesia				
	Japan		x	x	Green Power Certification System
	Philippines				
	Singapore				
Europe	Austria	x	x	x	Umweltzeichen
	Belgium	x	x	x	
	Denmark	x	x	x	
	Finland	x	x	x	Norppaenergia
	France	x	x	x	EVE – Electricité Verte
	Germany	x	x	x	Grüner Strom Label, Öko-Strom, ok-power, TÜV Nord, TÜV SÜD Generation EE, TÜV SÜD Generation EE+, TÜV SÜD EE01, TÜV SÜD EE02
	Hungary			x	
	Ireland	x	x		
	Italy		x	x	100% energia verde
	Netherlands		x		Milieukeur Groene Elektriciteit
	Poland	x	x	x	
	Portugal		x		
	Spain	x	x	x	
	Sweden	x	x	x	Bra Miljöval
	Switzerland	x	x	x	naturemade basic, naturmade star
	Turkey	x	x	x	
	UK	x	x		
Oceania	Australia			x	GreenPower
	New Zealand				
Total	34	15	22	22	21

Table 3: Overview of the systems in place in countries surveyed. If there is a labelling system in place, a declaration or a tracking system is not necessarily needed as the label organisation could provide these service and information.

Declaration system

Less than half of the countries surveyed have a declaration system. Of the 15 countries with a declaration system, only two are non-European countries (US and Chile).

Trading system

22 out of the 34 countries surveyed have a trading system for renewable electricity of which 16 are European countries. Hence, nearly all European countries surveyed (Hungary was the only exception) had a trading system, due to Europe's leading role in setting up RECS. Note that 24 countries were members of RECS as of 2007, and that in addition to the 19 countries included in the survey, Estonia, Luxembourg, Norway, Slovenia and Romania are also RECS members. Overall, 81% of the globally existing trading systems are RECS based (18 out of 22).

Trading systems on the American continent exist only in the USA and Canada. This is in contrast to Asia where China, Japan and India have trading systems. Thus, half of the participating Asian countries trade green electricity through a system but none of them is a RECS member. In South Africa, green energy is traded through RECS.

Tracking system

In Europe and America tracking systems are widespread; about three quarters of the participating countries in Europe (13 out of 17 countries) and nearly three quarters in America (5 out of 7 countries) have such a system. In Asia two countries track information; Africa and Oceania each have one country where a tracking system exists.

Labelling system for electricity from renewable energy sources

Overall 13 out of 34 surveyed countries have at least one label.

Out of 19 labels mentioned in the survey 14 are present in Europe, indicating a high interest in labels in European countries. Switzerland and the US have two labels and Germany is way ahead with six labels.

On the Asian continent China and Japan seem to be the pioneers in a green energy label. A private labelling initiative triggered the labelling system in Japan. In Shanghai (China) the World Bank initiated a pilot project for an energy label through its programme "Asia Alternative Energy Program (ASTAE)".

4.2 Results of the assessment of labels

The following table shows the results of the assessment of the labels against the sustainability and process criteria. Note that the table is not intended to be used to rank the labels but as a way of assessing labels' performance against set criteria, which are of interest to electricity consumers. Please refer to chapter 3 for the assessment methodology.

The full details on each criterion can be found in chapter 8.2.

Overall comments

- Some of the labels are very broadly defined and are basically applicable to all sorts of renewable electricity. These labels either did not include the sustainability criteria at all or only had vague definitions.
- In general, the labels scored better in procedural criteria than with respect to sustainability criteria.
- The labels often reflect country specific issues; for example the only two labels that allow electricity from fossil sources (limited to highly efficient gas-fired CHP) are based in Germany, a country with a long history of electricity produced from coal. Likewise, the Swiss labels concentrate on hydropower as Switzerland has abundant water resources; and the Canadian label has criteria for biomass as the country has plenty of forests.

Sustainability criteria

Ecological criteria

- All of the 19 labels analysed certify electricity from hydropower plants. However, most labels are rather weak with respect to ecological criteria; only about half have further criteria in place to regulate ecological aspects. Only "naturemade star" has very strict and concise rules concerning hydroelectricity. The French label "EVE – Electricité Verte" is in the process of setting up stringent rules for hydroelectricity.
- Overall, criteria regarding hydro are not very strict and well developed, a surprising fact considering that hydropower amounts to up to 80% of renewable electricity worldwide.

Sustainability Criteria – All Labels

Category	Criteria	Bra Miljöval (SE)	EcoLogo (CA)	100% energia verde (IT)	EVE - Electricité Verte (FR)	Green-e (US)	Green Power Certification System (JP)	GreenPower (AU)	Grüner Strom Label (DE)	Milieukeur Groene Elektriciteit (NL)	naturemade basic (CH)	naturemade star (CH)	Norppaenergia (FI)	ok-power (DE)	Power Scorecard (US)	TÜV SÜD EE01 (DE)	TÜV SÜD EE02 (DE)	TÜV SÜD Generation EE+ (DE)	TÜV SÜD Generation EE (DE)	Umweltzeichen (AT)
Ecological criteria	1 Hydroelectricity: minimum flow regulations																			
	2 Hydroelectricity: hydro peaking																			
	3 Hydroelectricity: reservoir management																			
	4 Hydroelectricity: bed load management																			
	5 Hydroelectricity: power plant design																			
	6 Hydroelectricity: ecological improvement fund																			
	7 Hydroelectricity: equal treatment of all sizes of power plants																			
	8 Electricity from wind																			
	9 Electricity from photovoltaics																			
	10 Electricity from biomass																			
	11 Electricity from geothermal energy and tidal power plants																			
	12 Electricity from waste																			
	13 Exclusion of non-renewable electricity																			
	14 Quality of renewables support scheme																			
Social and economical criteria	15 No rivalry between electricity generation and food cultivation																			
	16 Securing soil fertility and land use																			
	17 Biomass tracking																			
	18 Social criteria for dam building projects																			
	19 Corporate social responsibility of electricity producer																			
	20 Market share																			

Process Criteria – All Labels

Category	Criteria	Bra Miljöval (SE)	EcoLogo (CA)	100% energia verde (IT)	EVE - Electricité Verte (FR)	Green-e (US)	Green Power Certification System (JP)	GreenPower (AU)	Grüner Strom Label (DE)	Milieukeur Groene Elektriciteit (NL)	naturemade basic (CH)	naturemade star (CH)	Norppaenergia (FI)	ok-power (DE)	Power Scorecard (US)	TÜV SÜD EE01 (DE)	TÜV SÜD EE02 (DE)	TÜV SÜD Generation EE+ (DE)	TÜV SÜD Generation EE (DE)	Umweltzeichen (AT)
Organisation and professionalism	1 Representation of industry	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None
	2 Representation of pressure groups	Low	None	None	None	None	None	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
	3 Guarantee of legal compliance	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None
	4 Audit by independent third party	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None
	5 Periodical revaluation of certification	None	None	Low	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None
Balancing	6 Declaration of origin	None	Low	None	None	None	None	Low	None	None	None	None	None	None	None	None	None	None	None	None
	7 Avoidance of double counting	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None
	8 Regulation for deficit in supply	None	None	None	Low	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None
	9 Only net energy permitted	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None
	10 LCA verification	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None
Transparency	11 Availability of information on electricity quality	Low	None	None	None	None	None	Low	Low	None	Low	Low	Low	Low	None	None	None	None	None	None
	12 Communication and availability of criteria	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None
	13 Protection of consumer rights	None	None	None	Low	Low	None	Low	None	None	None	None	None	None	None	None	None	None	None	None

None Low Medium High Please refer to page 15 for further details to the ranking methodology

Figure 5: Overview of the labels evaluated in this survey (Source: PwC).

- The labels often had stricter conditions on hydropower than for other renewable electricity sources such as wind, solar or biomass, even though such sources supply a comparatively smaller share of renewable electricity production than hydro.
- All of the 19 labels analysed certify electricity from biomass. Around two thirds of the labels do not have very strict criteria in place to regulate ecological aspects of production.
- The “naturemade” labels score best regarding criteria for electricity generation from biomass. The French label “EVE” is in the process of setting up stringent rules for electricity from biomass.
- Only one of the labels analysed – “ok-power” – allows for electricity from fossil energy sources (limited to high efficient gas-fired CHP). “Grüner Strom Label” also has a label that allows for electricity from fossil fuels. Nevertheless, this label was not included in the analysis.
- The majority of labels do not have support schemes to increase the share of renewable electricity in the electricity market.

Social and economical criteria

- Only five labels request strict tracking of electricity production based on biomass in order to avoid using arable land that would be better used for food production. Strict biomass tracking allows the origin of the biomass used for the electricity generation to be traced. Some further labels have weak rules about the origin of the biomass, but do not have any effective control mechanism in place.
- A qualified evaluation of a label’s creation of economic value based on the publicly available information was not directly possible. Instead, the market share¹⁵ of the labelled electricity was used as a proxy for the creation of sustainable economic value.

Procedure criteria

Organisation and professionalism

- All labels have pressure groups, such as environmental, consumer or social organisations, in the body responsible for the certification process. However, only ten out of 19 analysed labels also have an independent auditing body to approve the quality of the labels.
- Roughly half of the labels put a limit on the temporal validity of the certificates they issue. After a fixed validity period ranging from one up to five years, the electricity producer undergoes re-examination and receives the certification if it still meets the criteria.

Balancing

- Half of the labels allow a deficit in supply of certified electricity. Most, however, request that a potential deficit be made up within one year. The tightest rules in this respect are laid down by the four “TÜV SÜD” labels that do not allow any deficit in supply. In contrast, five labels do not have any regulation for a deficit in supply.
- Only four of the labels analysed address the topic of double counting actively. Even in these cases though, the information on the control mechanism is not adequate.

Transparency

- Most labels provide basic information on the criteria and requirements. The assessment of the communication and availability of the criteria was based on the requirements of an average consumer, which is mainly why most labels score high on this criterion. However, many labels do not fulfil high standards of communication (see textbox on the next page).
- The situation with respect to protection of consumer rights is unsatisfactory: on the one hand many labels have a high degree of consumer protection, while on the other there are several labels with no protection of consumer rights what soever.

¹⁵ For further explanations on the market share please refer to appendix 8.3.

Need for improved communication

Considering that all labels are applied to the same product (electricity), it was expected that substantial efforts would be undertaken by label owners to explain and justify the price premium the consumer pays for labelled electricity. Easily understandable and publicly available information about the rules and conditions for the labelling process for renewable electricity should be provided to allow potential clients a solid base for the purchase decision and other stakeholders to get the necessary information.

The reality, however, is not so. In general, gathering relevant information to compare labels for renewable electricity today is difficult due to the poor quality and imprecise presentation of published information, low accessibility and language barriers. The labels analysed often failed to conform to one or several of the key principles described below:

- **Accessibility of complete information:** A prerequisite for a label to operate should be that the information about the label, its processes and principles, is publicly accessible (i.e. available online). This crucial information, however, was often only partially available and difficult to find.
- **Updated information:** The published information has to be updated on a regular basis. Some of the information published online was not in line with information received from the labels directly.
- **Useful form:** The information published should be presented in a comprehensive, well-structured manner, including all relevant information. The information concerning principles, processes and criteria has to be presented in a manner that excludes the possibility of misinterpretation.

- **Availability of label responsible for stakeholder questions:** The availability of the responsible body for stakeholders questions was more than unsatisfactory. Various negative reactions occurred when questions about the labels' principles were raised. Moreover, the communication with some labels was very difficult as it took several weeks for answers to inquiries to arrive. Some labels interpreted the attempts to clarify open questions about the label as an insult. Answers provided by the label owners were often inaccurate with respect to data or underlying documentation.
- **Language:** It is desirable that information provided on the label not only is in the language of the home country, but also translated into other languages, notably English. In a globalised world with multinational companies, translating information to the most common languages raises transparency and comparability. The principles underlying many labels were not available in English.

The result of the above transparency issues is that the information provided in this survey may not be complete, as the labels might have been assessed on the basis of incomplete information. Even though every effort was made to minimise this risk, it was impossible to succeed in all instances, as missing information requested directly from label organisations was not always received. This fact indicates once more that marketing activities, investor relations, client relationships and stakeholder dialogue are either not a priority or not core competencies of some of the labels.

5 Concluding remarks

The detailed results of the survey are set out in the country and label reports in chapters 6 and 7. This chapter provides a summary of the outcome of the survey as well as of the discussions within the project team and is intended to provide input for further thoughts and discussion. It is structured along the three key questions answered in the survey:

- What are the characteristics of today's national renewable electricity markets?
- How sustainable and credible are labels for renewable electricity?
- What role do labels play in today's renewable electricity market and what additional contribution could they make in the future?

What are the characteristics of today's national renewable electricity markets?

- **Renewable electricity is still a niche product:** The market for green electricity is still marginal on a global level, but is expected to grow further.
- **The availability of labelled renewable electricity is geographically concentrated:** While the availability of renewable electricity is increasing in many regions of the world, as outlined in chapter 1, labelled products that fulfill broad sustainability criteria are currently still concentrated in Europe and North America. Many countries do not even have a market for renewable electricity, either because of a lack of deregulated markets or simply because the potential of green electricity has not been tapped into by market players.
- **Political targets are being implemented to promote renewable electricity:** An increasing number of governments are setting targets regarding the share of renewable electricity in the production or consumption mix. This is done mostly by means of financial incentives, such as subsidies or support schemes. This trend towards increased regulation on a national and supra-national level is expected to increase in the future.
- **Regulations concerning renewable electricity must be concisely defined:** Regulators should promote and support the mandatory schemes and ensure that voluntary markets can increase the share of renewable electricity over and above government mandates.

How sustainable and credible are labels for renewable electricity?

- **Sustainability criteria for labels are of mixed quality:** The criteria with respect to sustainability for different labels are not equally strict. Some labels have very strong ecological and social and economic criteria, while others concentrate only on certain ecological criteria. Comparability is very difficult, particularly as some label owners do not transparently communicate their criteria.
- **Labels to focus on more demanding sustainability criteria:** It was surprising to discover that most of the labels performed well with respect to procedural criteria, but often poor in sustainability criteria. Clearly it is to be welcomed that nearly all labels have trustworthy procedures in place that function as designed. Nevertheless, label owners are encouraged to further develop and implement strict criteria regarding sustainability, considering ecological, economic and social aspects.
- **Lack of transparency and communication of labels:** Consumers pay a price premium for additional sustainability criteria and therefore would value full transparency. In reality, however, obtaining relevant information regarding many criteria and procedures is often difficult as transparency, marketing or information is insufficient.
- **Most labels are strong in procedural criteria:** In general, the labels have procedures in place that ensure a sufficient level of credibility.

What role do labels play in today's renewable electricity market and what future additional contribution could they make?

The impacts from renewable electricity are not only positive; though electricity from renewable sources has a low carbon footprint and does not deplete the stocks of energy resources for future generations, generation of renewable electricity can have negative effects locally, such as flooding agricultural land, blocking fish migration routes or destroying their breeding grounds, or destroying cultural heritage. Herein lies a huge potential for labels because they can serve as identifiers encompassing a broad range of sustainability (environmental, social and economic) criteria to help consumers choose the electricity supplier that meets their needs. Indeed, in the voluntary market, labels are the only providers of such broad criteria today. This main role and contribution of labels will even increase in importance due to the growing renewable electricity market.

One of the key hurdles for a consumer that wishes to buy renewable electricity is the lack of information in the market due to a jungle of renewable electricity products, such as green tariffs, certificates or labelled electricity. The ownership of any additional sustainability value such as CO₂ reductions that buying such renewable electricity products implies often remains unclear. The guarantee of ownership of such additional value is fundamental. This is a service renewable electricity labels can and should provide in the voluntary renewable electricity market.

Another challenge faced in particular by global corporations is the lack of a globally accepted renewable electricity label; this holds them back from establishing a globally consistent renewable electricity purchasing policy to source electricity on the basis of the same criteria in each country of operation. Gaining consensus among labels to define and market a global label for renewable electricity based on sustainable criteria could be difficult. However, it can be assumed that a label with a global reach would have a positive impact on sustainable resource management and transparency in renewable electricity markets.

6 Country reports

6.1 Argentina

National electricity production

The diagram below shows the energy sources¹⁶ for the gross national electricity production in Argentina for 2006. The small pie chart on the right shows the share in production of each form of renewable electricity in detail.

National legal framework

The legal framework regulating the electricity market in Argentina is the Electrical Energy Regulation (in Spanish: Régimen de la Energía Eléctrica – Ley N° 24.065). It regulates generation, transport, distribution and end consumers on a national level.

Additionally, the government financially supports the production of electricity from renewable energy sources with subsidies. The subsidies provide two possible types of benefits for investors in new facilities for production of electricity from

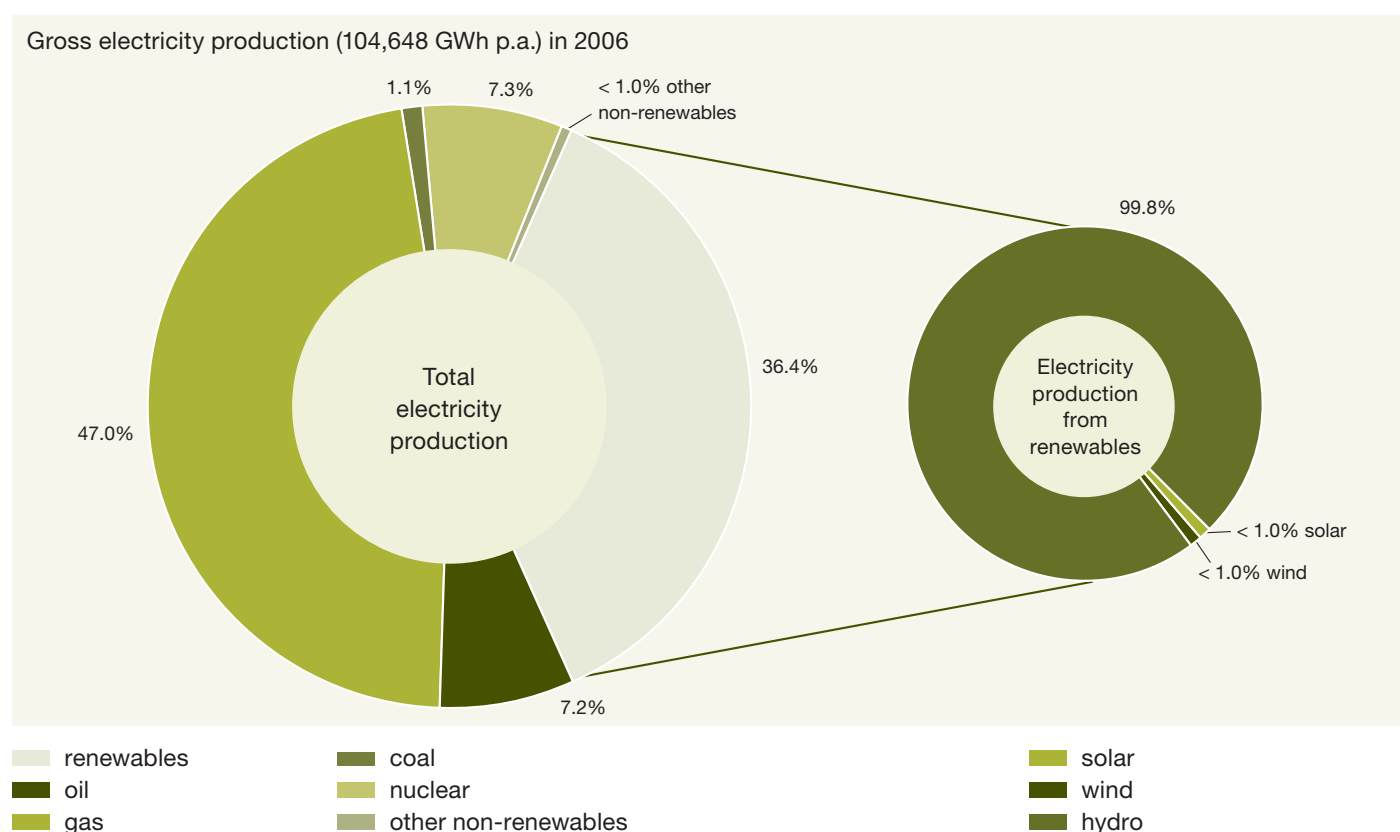


Figure 6: Gross electricity production in Argentina in 2006 (Data source: Secretaría de energía of the Argentinean Republic, Informe del Sector Eléctrico, 2006)

¹⁶ The following energy sources were assessed: oil, gas, coal, nuclear, solar, wind, biomass, hydro, geothermal, waste, biogas, other renewables and other non-renewable energy sources.

renewable energies: first, intensive return of value-added tax and second an intensive amortisation in the income/corporate tax. The subsidies' base is Law n° 26.190, the National Promotion for the Use of Renewable Energy Sources Intended for the Production of Electrical Energy (in Spanish: Régimen de Fomento Nacional para el uso de fuentes renovables de energía destinada a la producción de energía eléctrica). Subsidies are available for solar, wind, biomass, geothermal energy and hydroelectric energy.

In addition, a Trust Fund of Renewable Energies is managed by the Federal Council of Electrical Energy. This fund supports electricity generated from wind, biomass, geothermal and hydroelectric systems with up to 15 AR \$/MWh and electricity generated with photovoltaics with up to 900 AR \$/MWh. These subsidies will be paid over a period of 15 years.

Overview of the systems and the electricity market

System	Yes/No	Information available
Declaration system	No	
Trading system (redeeming system)	No	
Tracking system/Guarantee of Origin	Yes	Applicable for electricity generated from any energy source
Responsible body for registration of the tracking information/databases	CAMMESA (Administration Company of the Electric Wholesale Market. In Spanish: Compañía Administradora del Mercado Mayorista Eléctrico)	www.cammesa.com.ar
Labelling system	No	

Table 4: Overview of the systems in Argentina (Source: PwC)

¹⁷ The tracking system refers to the production of electricity and declares the origin of the electricity and the corresponding energy source. It differs from the declaration system, which informs the end consumer about the consistence of the delivered electricity mix.

6.2 Australia

National electricity production

The diagram below shows the energy sources for the gross national electricity production in Australia for 2007. The small pie chart on the right shows the share in production of each form of renewable electricity in detail.

National legal framework

Australia's legal framework to regulate the electricity market consists of three regulations; all are national in scope.

First, the National Electricity (South Australia) Act 1996, also known as the National Electricity Law, has the objective of promoting efficient investment, operation and use of electricity services for the long term interests of consumers of electricity with respect to: (a) price, quality, safety, reliability and security of supply of electricity; and (b) the reliability, safety and security of the national electricity system. Second, the Renewable Energy (Electricity) Bill 2000 is a preliminary legal requirement for electricity retailers and other large electricity buyers to source an additional 2% of electricity purchases

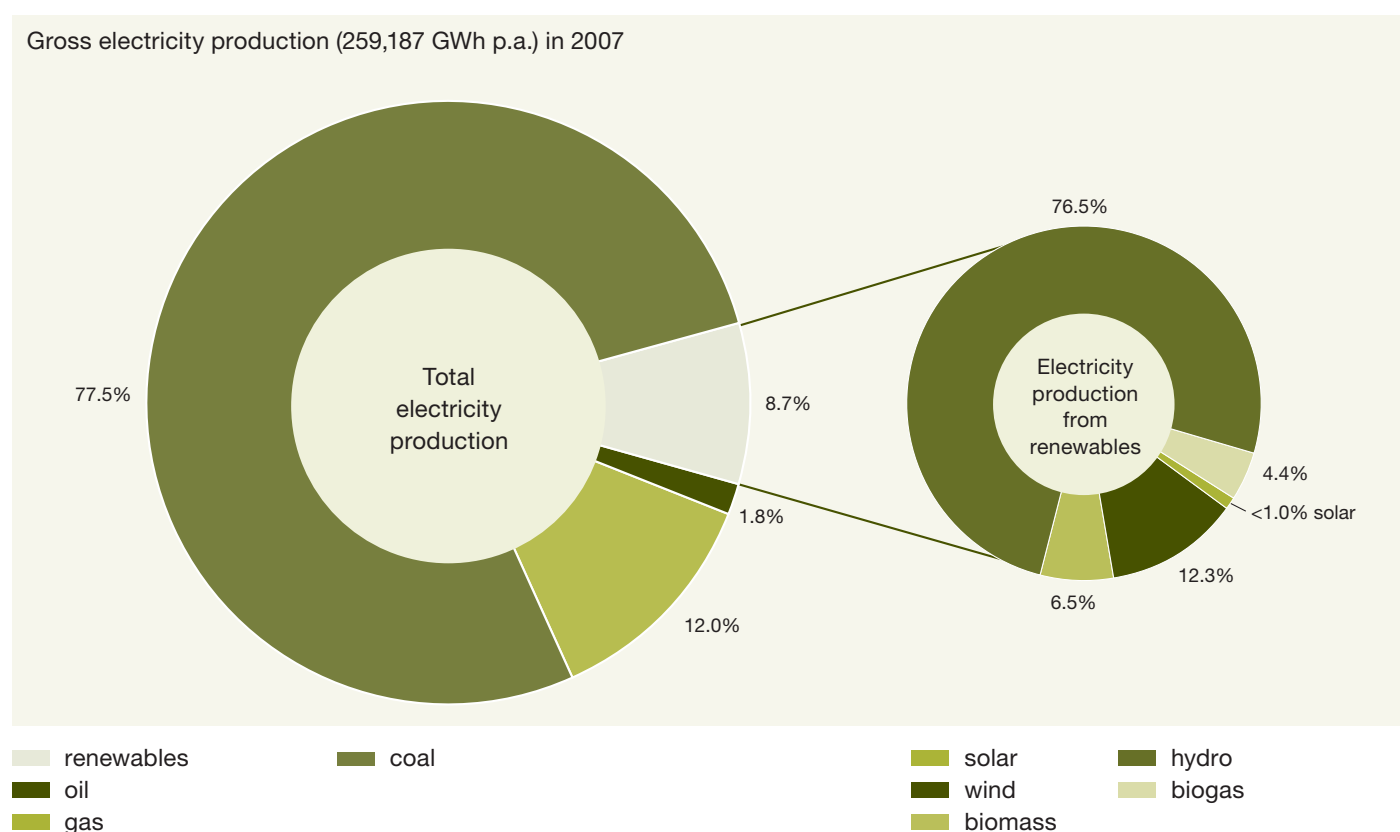


Figure 7: Gross electricity production in Australia in 2007 (Data source: IEA Online Dataservices, OECD Electricity and Heat Generation – Renewables © OECD/IEA, 2008)

from renewable or specified waste-product energy sources by 2010. Third, the Renewable Energy (Electricity) Charge Bill 2000 regulates the amount of the shortfall charge that is due when an electricity supplier does not meet its minimum renewable energy requirements under the Renewable Energy (Electricity) Bill 2000.

The government supports the production of electricity from renewable energy sources via the Renewable Energy Equity Fund (REEF). Subjects of the REEF are: solar, wind, biomass, geothermal energy and hydroelectric energy. The REEF programme is a specialist renewable energy equity fund based on the Innovation Investment Fund model. It provides venture capital to assist small companies to commercialise R&D in renewable energy technologies. These subsidies are not part of the above-mentioned legislations.

Overview of the systems and the electricity market

In Australia, 19 out of 44 electricity suppliers offer certified electricity from renewable energy sources. The electricity supplier is responsible for selling and distributing labelled electricity. Currently the 19 “GreenPower” providers sell different GreenPower products to households. The GreenPower label specifies the amount of accredited GreenPower the energy retailer is purchasing as a percentage (10%–100%) of a household’s electricity consumption. 50% means that the energy supplier purchases renewable energy from accredited GreenPower sources to the amount equal to 50% of the average Australian household. Depending on the electricity supplier labelled electricity products can be ordered by phone or online.

System	Yes/No	Information available
Declaration system	No	
Trading system (redeeming system)	No	There is trading in renewable energy certificates (RECs) in Australia – but no “system” for doing so as such (most trades take place bilaterally between generators and retailers). There is also a Government Registry that shows ownership of RECs.
Tracking system/Guarantee of Origin	Yes	Applicable for electricity generated from renewable energy sources.
Responsible body for registration of the tracking information/databases	Renewable energy regulator	www.rec-registry.gov.au
Labelling system	GreenPower	See relevant page in this survey www.greenpower.gov.au

Table 5: Overview of the systems in Australia (Source: PwC)

6.3 Austria

National electricity production

The diagram below shows the energy sources for the gross national electricity production in Austria for 2007. The small pie chart on the right shows the share in production of each form of renewable electricity in detail.

National legal framework

Austria's legal framework to regulate the electricity market consists of three regulations; all are national in scope.

First, the Electricity Act (2001) (in German: Elektrizitätswirtschaftsorganisationsgesetz) regulates the organisation of the electricity market and full market opening. Second, the Security of Supply Act (2006) (in German: Versorgungssicherheitsgesetz) aims at ensuring the security of energy supply. Third, the Renewable Electricity Act (2006) (in German: Ökostromgesetz) with the goal of promoting renewable energy.

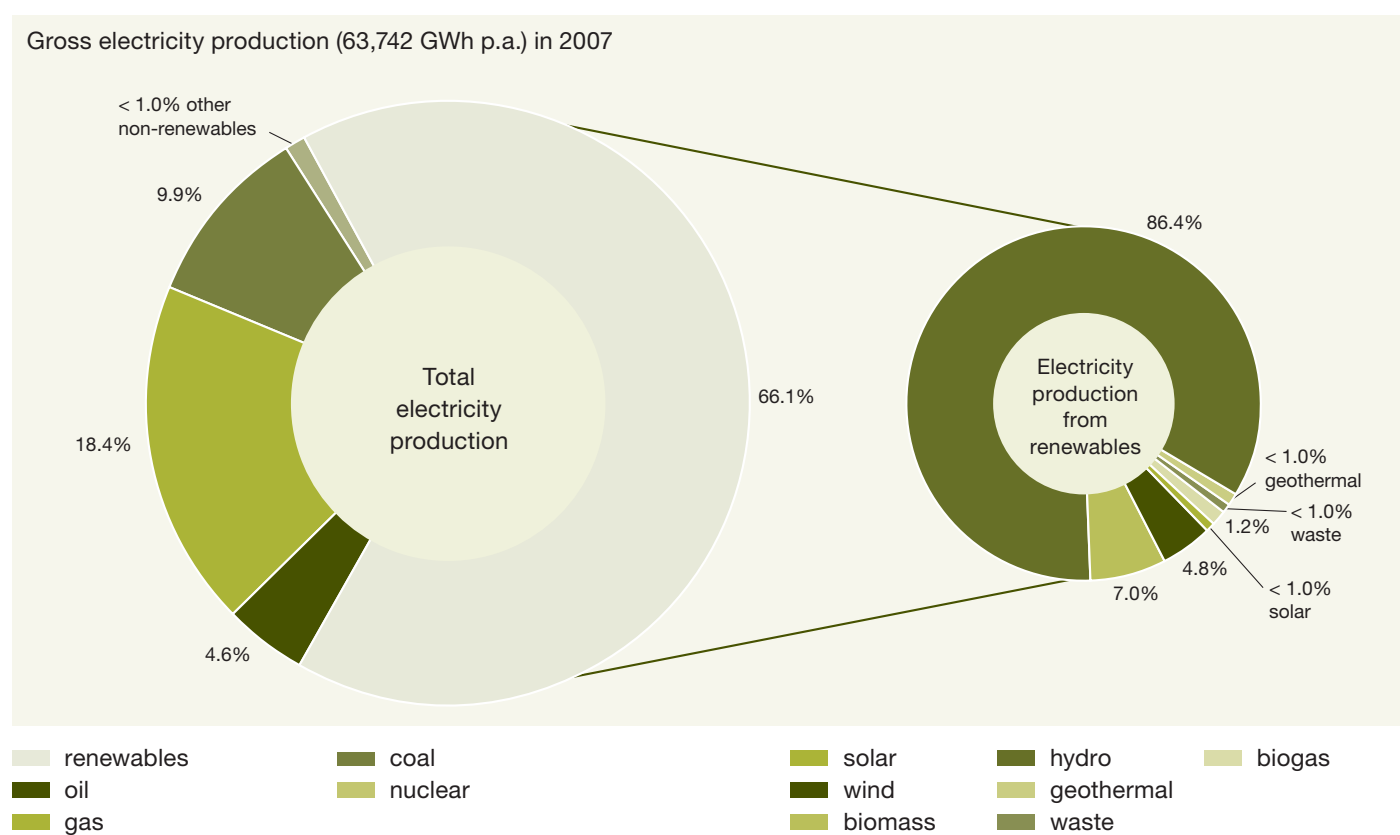


Figure 8: Gross electricity production in Austria in 2007 (Data source: IEA Online Dataservices, OECD Electricity and Heat Generation – Renewables © OECD/IEA, 2008)

The Austrian government supports the production of electricity from renewable energy sources with subsidies under the Ordinance to the Renewable Electricity Act. Subsidies are available for solar, wind, biomass, geothermal and small scale hydroelectric energy. Electricity produced from renewable energy is collected by the national authority OEMAG (Renewable energy operation company). Generators obtain a cost based feed-in tariff. Once contracted, the tariff is guaranteed for the next 10 to 12 years, depending on the energy source. Financing is guaranteed by a contribution of approximately 10%, depending on daily generation, the total amount taken up by the supplier and an additional mark up to the network tariffs. All electricity products contain a proportion of subsidised green electricity.

Overview of the systems and the electricity market

In Austria, all electricity suppliers have to deliver certified electricity. The electricity suppliers are responsible for selling and distributing the certified electricity. All 147 suppliers have the obligation to buy around 10% of their energy as renewable energy, depending on the daily generation (based on prior year and state regulated price). Depending on the electricity, supplier certified electricity products can be ordered by product brochure, by phone or online.

System	Yes/No	Information available
Declaration system	Stromkennzeichnung	www.recs.org/recs/themembers.asp?country=austria
Trading system (redeeming system)	RECS system	www.herkunftsnachweis.at
Tracking system/Guarantee of Origin	Guarantee of Origin (Herkunftsnachweis)	
Responsible body for registration of the tracking information	Grid operator	www.herkunftsnachweis.at
Responsible body for the operation of the database	E-Control	See relevant page in this survey
Labelling system	Umweltzeichen TÜV SÜD EE01, Generation EE and EE+, UE01	www.umweltzeichen.at

Table 6: Overview of the systems in Austria (Source: PwC)

6.4 Belgium

National electricity production

The diagram below shows the energy sources for the gross national electricity production in Belgium for 2007. The small pie chart on the right shows the share in production of each form of renewable electricity in detail.

National legal framework

Belgium's legal framework for regulating of the electricity market consists of four regulations; one is national, the others are regional in scope.

The Organisation of Electricity Market Law (in Dutch: Wet betreffende de organisatie van de elektriciteitsmarkt, 29 April 1999), was last updated on 8 June 2008 and is the national legal framework. It focuses on production, transmission network operators, tariffs, accountancy, liberalisation of the electricity market, installation regulation, network connection and import. The national regulator is called CREG (Commissie voor de Regulering van de Electriciteit en het Gas/Commission de Régulation de l'Electricité et du Gaz). The framework for monitoring the energy sector is divided up to cover three

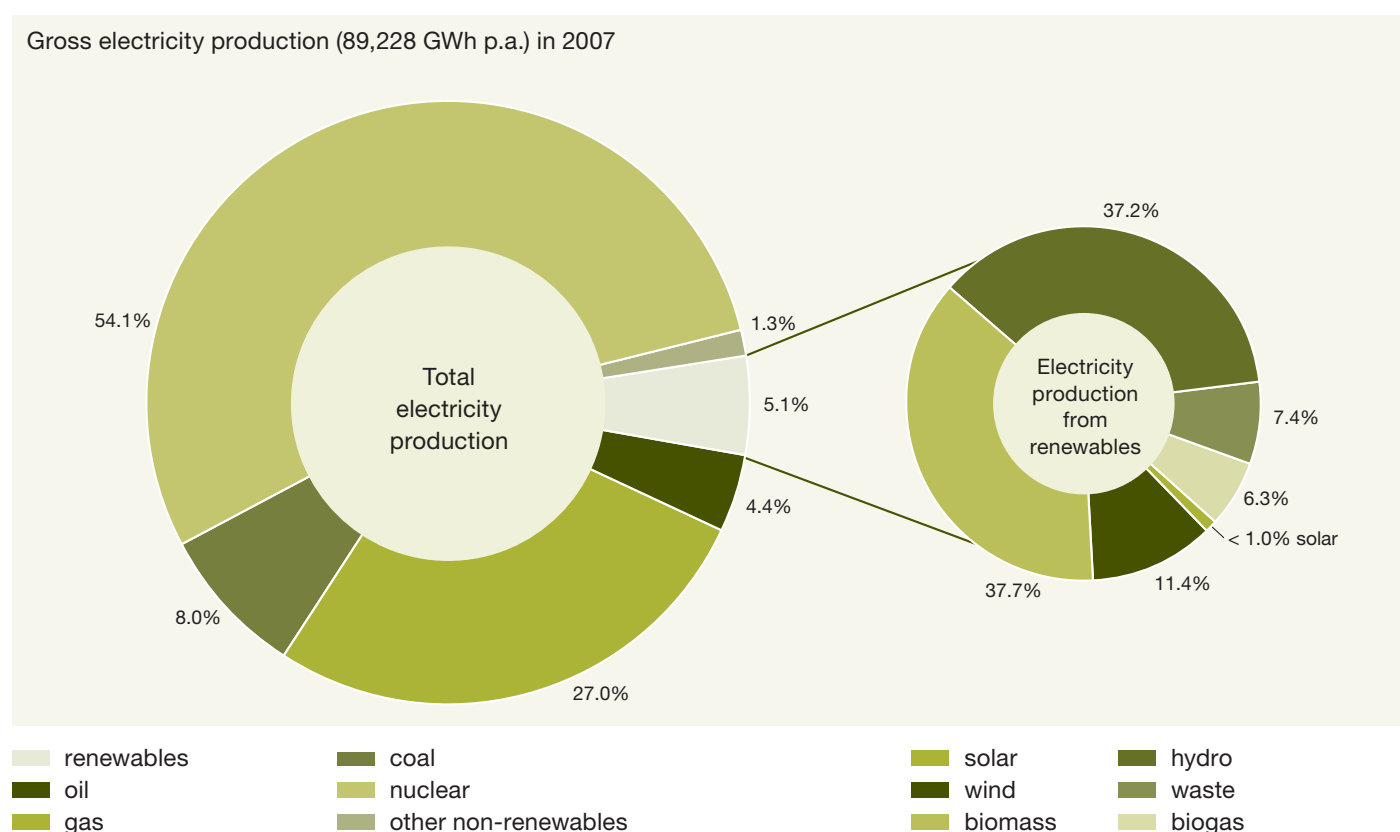


Figure 9: Gross electricity production in Belgium in 2007 (Data source: IEA Online Dataservices, OECD Electricity and Heat Generation – Renewables © OECD/IEA, 2008)

regions, mirroring the Belgian political scene: the Walloon region, the Brussels capital region and the Flanders region. For the Walloon region the Decree of 12 April 2001 on the Organisation of the Regional Electricity Market (in French: Décret relatif à l'organisation du marché régional de l'électricité), last updated on 17 July 2008, for the Brussels capital region; the Decree concerning the organisation of regional electricity market (in Dutch: Ordonnantie betreffende de organisatie van de gewestelijke elektriciteitsmarkt), last updated on 14 December 2006, and for the Flanders region the Organisation of Electricity Market Decree (in Dutch: Decreet houdende de organisatie van de electriciteitsmarkt), last updated on 25 May 2007. The common theme of the three regional legal frameworks relates primarily to the distribution of the electricity, protection of the consumer and renewable trading certificates. Each region has its own regulating body: in the Walloon region the CWape (Commission Wallone pour l'Energie), in the Brussels capital region the BRUGEL (BRUssel Gas en ELectricité/BRUxelles Gaz ELectricité) and finally in Flanders the VREG (Vlaamse Reguleringsinstantie voor de electriciteits- en gasmarkt).

The government supports the production of electricity from renewable energy sources through a Green Certificate system and a minimum tariff for green electricity. At a national level only offshore wind electricity is offered by CREG (national regulator). The subsidies support energy generated from solar, wind, biomass as well as geothermal energy and hydroelectric energy. These subsidies are part of all mentioned legislations although the support mechanisms are implemented at regional level.

Overview of the systems and the electricity market

Almost all electricity suppliers offer electricity from renewable energy sources.

System	Yes/No	Information available
Declaration system	Yes	
Trading system (redeeming system)	RECS, VREG (Flanders), CWaPE (Walloon Region), CREG (national i.e. offshore), BRUGEL (Brussels capital region)	www.recs.org/recs/themembers.asp?country=belgium www.vreg.be (via certificatenbeheer.vreg) www.cwape.be www.creg.be www.brugel.be
Tracking system/Guarantee of Origin	Yes	Applicable for any energy sources
Responsible body for registration of the tracking information/databases	VREG (Flanders), CWaPE (Walloon Region), CREG (national i.e. offshore), BRUGEL (Brussels capital region) located in Brussels, and Namur (Jambes)	www.vreg.be (via certificatenbeheer.vreg), www.cwape.be , www.creg.be , www.brugel.be
Labelling system	No	

Table 7: Overview of the systems in Belgium (Source: PwC)

6.5 Brazil

National electricity production

The diagram below shows the energy sources for the gross national electricity production in Brazil for 2007. The small pie chart on the right shows the share in production of each form of renewable electricity in detail.

National legal framework

The legal framework for regulating the electricity market in Brazil is determined by ANEEL – the Brazilian Electricity Regulatory Agency (in Portuguese: Agência Nacional de Energia Elétrica). It was created on 26 December 1996 by Law 9427. ANEEL is a semi-autonomous governmental organisation established under a special regime, linked to the Ministry of Mines and Energy (MME) and its scope is national. Its aim is to regulate the generation, transmission, distribution and commercialisation of electric power and to mediate conflicting interests among agents in the electrical sector and consumers. In addition it also intends to enforce investment by the regulated entities and to encourage competition amongst operators.

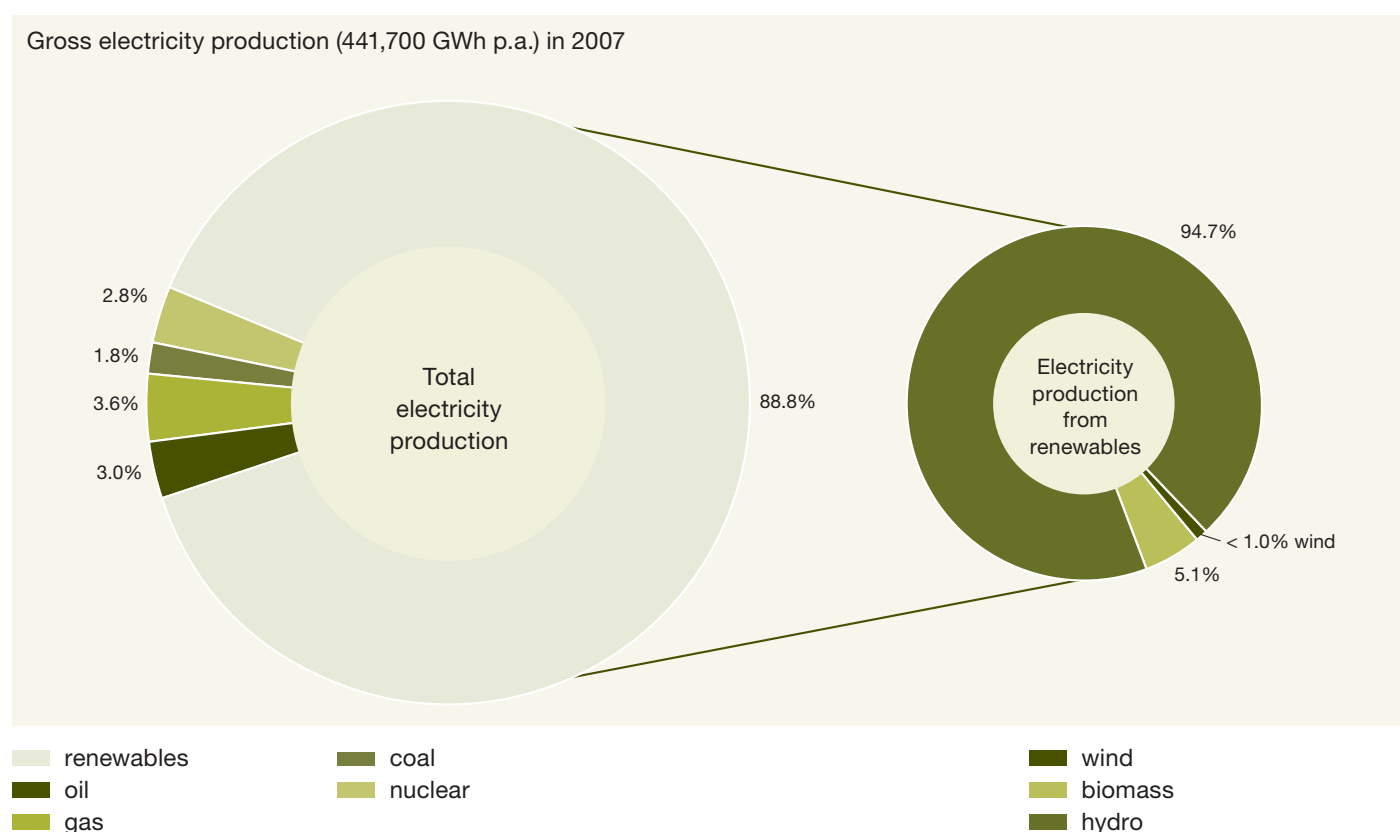


Figure 10: Gross electricity production in Brazil in 2007 (Data source: EPE – Empresa de Pesquisa Energética do Ministério de Minas e Energia, Balanço Energético Nacional 2008)

The government supports the production of electricity from renewable energy sources with subsidies through PROINFA – Programme of Incentives for Alternative Electricity Sources (in Portuguese: Programa de Incentivo a Fontes Alternativas de Energia Elétrica). Subjects of the programme are: wind, biomass and micro-hydropower. PROINFA's goal was to introduce 3,300 MW of renewable energy (wind, biomass cogeneration and micro-hydropower) by 2007. But according to the National Electric System Operator (Operador Nacional do Sistema Elétrico), in the 2008 operation plan only 1,930 MW stem from PROINFA, accounting for around 60% of the initial target. Once the phase one targets are achieved, in the second phase, the programme aims at increasing renewables' share of annual energy consumption to up 10%. Participating plants will be required to issue Renewable Energy Certificates annually in proportion to the amount of clean energy they produce. Once this target is met plants aim to increase the share of energy produced by renewable sources by up to 10% of the total annual energy consumption within 20 years. These subsidies are part of Law 10438.

Overview of the systems and the electricity market

In 2004, the electricity sector in Brazil was restructured and the government created two possible environments for trading electricity: the regulated market, using controlled bidding by the distributors, and a free market with direct trading. The state-owned company Eletrobrás, is responsible for 40% of the installed capacity on the electric power grid in Brazil.

System	Yes/No	Information available
Declaration system	No	
Trading system (redeeming system)	No	
Tracking system/Guarantee of Origin	Yes	Applicable for electricity generated from any energy sources
Responsible body for registration of the tracking information/databases	ONS (in Portuguese: Operador Nacional do Sistema Elétrico)	www.ons.org.br
Labelling system	No	

Table 8: Overview of the systems in Brazil (Source: PwC)

6.6 Canada

National electricity production

The diagram below shows the energy sources for the gross national electricity production in Canada for 2007. The small pie chart on the right shows the share in production of each form of renewable electricity in detail.

National legal framework

Canada has an immense legal framework for the regulation of the electricity market.

With federal scope, the Energy Efficiency Act and the Energy Efficiency Regulations set out labelling standards for energy-use products as well as for collection of statistics and information about energy use and alternative energy. The Ontario Electricity Restructuring Act, 2004 – a regional legislation – re-organises Ontario's electricity system in order to address the critical need for new supply, increased conservation and price stability for consumers more effectively. The Ontario Energy Board Amendment Act (Electricity Pricing), 2003 ensures that low volume and designated consumers pay electricity prices

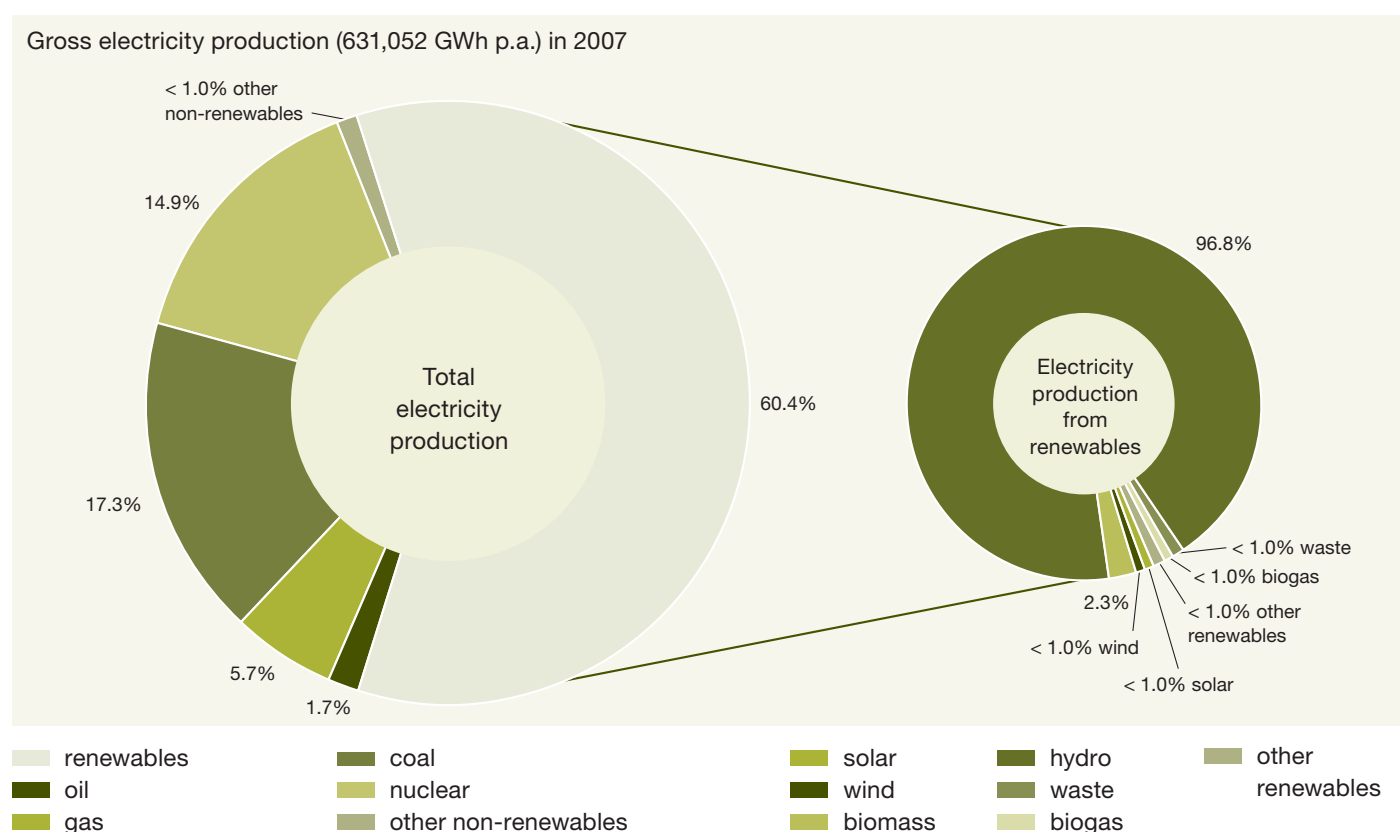


Figure 11: Gross electricity production in Canada in 2007 (Data source: IEA Online Dataservices, OECD Electricity and Heat Generation – Renewables © OECD/IEA, 2008)

which reflect the true cost of electricity, as a means of furthering fiscal responsibility and encouraging energy conservation. The independent regulator, the Ontario Energy Board (OEB), was given the power to develop new mechanisms for setting prices as of 1 May 2005. The Energy Conservation Responsibility Act, 2006 (also called the Energy Conservation Leadership Act) received Royal Assent in March 2006. Under the Act, ministries, agencies and broader public sector organisations will be required to prepare energy conservation plans on a regular basis, and report on energy consumption, proposed conservation measures, and progress. The Renewable Energy Act (Prince Edward Island) requires utilities to acquire at least 15% of electrical energy from renewable sources by 2010. This act includes regulations covering designated area regulations and net-metering systems: The Designated Areas Regulations are designed to ensure that large-scale (more than 100 kilowatt) wind farm projects are built in areas where development is economically viable: The Net-Metering Systems Regulations make it more economically feasible for homeowners, small businesses or farmers who have an interest in generating their own electricity to install small-scale generating systems – those that produce 100 kilowatts of energy or less.

The government supports the production of electricity from renewable energy sources in various ways. Subjects of the subsidies are: solar, wind, biomass and hydroelectric energy. There are a number of incentives to encourage the production of electricity from renewable sources. These include refunds for capital costs. These subsidies are not part of the legislation mentioned.

Overview of the systems and the electricity market

In Canada, six suppliers have received certification for offering certified electricity from renewable energy sources. The electricity supplier is responsible for selling and distributing the certified electricity. Any supplier that wants to seek certification would do it through the EcoLogo programme. This is a voluntary process. There is currently no information regarding suppliers that are not certified. Depending on the electricity supplier the certified electricity is purchased directly through the producer via phone or online.

System	Yes/No	Information available
Declaration system	No	
Trading system (redeeming system)	RECS	www.recs.org/recs/themembers.asp?country=canada
Tracking system/Guarantee of Origin	No	
Responsible body for registration of the tracking information/databases	No	
Labelling system	Eco Label Programme	See relevant page in this survey

Table 9: Overview of the systems in Canada (Source: PwC)

6.7 Chile

National electricity production

The diagram below shows the energy sources for the gross national electricity production in Chile for 2007. The small pie chart on the right shows the share in production of each form of renewable electricity in detail.

National legal framework

The legal framework for regulation of the electricity market in Chile is national in scope: it is the General Law of Electric Services and amendments (in Spanish: D.F.L. N°4 de 1959 Ley General de Servicios Eléctricos y sus modificaciones). It sets out plans, procedures and standards and maximum fees that may be charged by public service utilities, and reviews and amends the laws relating to electricity, its production, distribution and concessions. Its scope is national. Currently in discussion at state level is the Renewable Energy market legislation. It will define the minimum amount of renewable energy that must be sourced and modalities to set up a renewable energy model for large consumers.

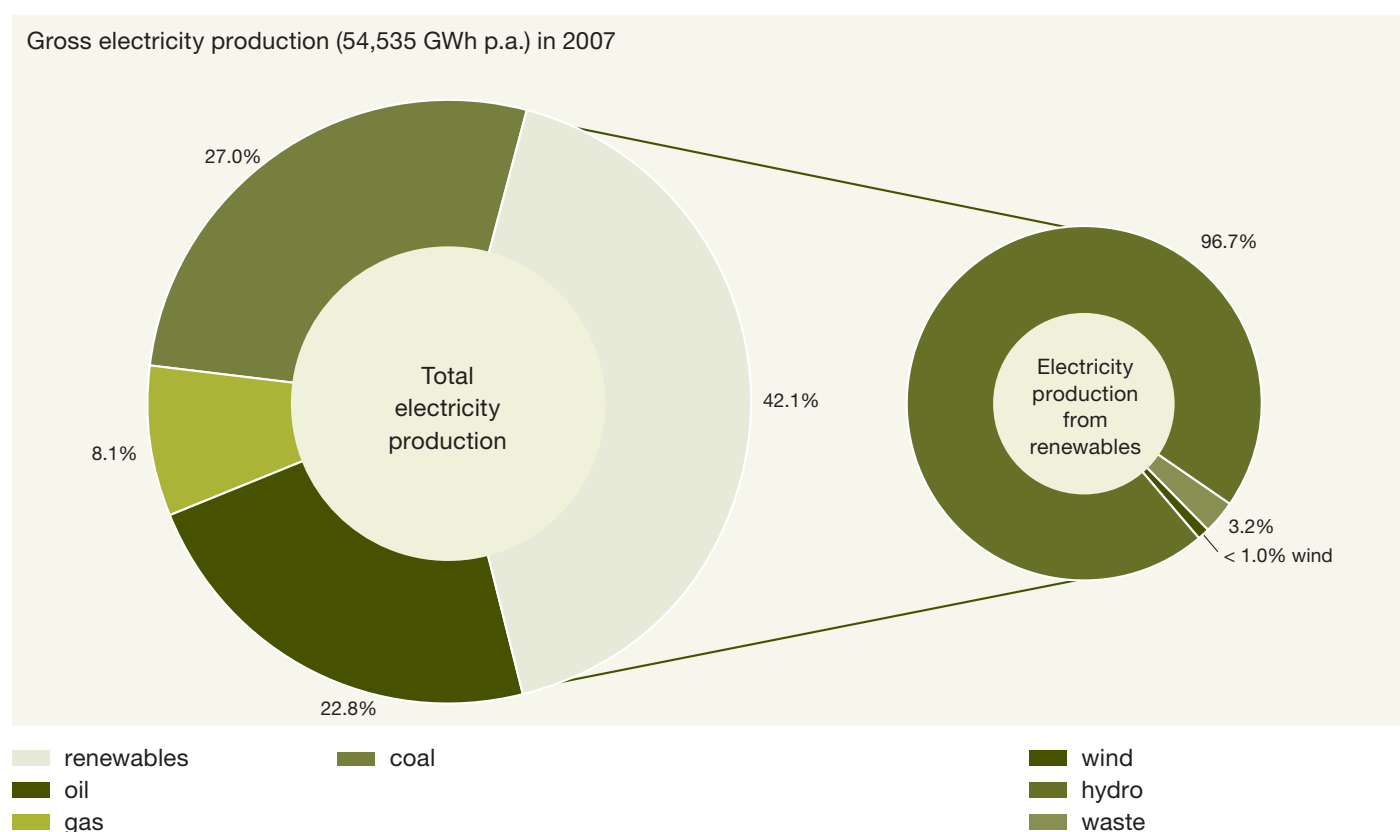


Figure 12: Gross electricity production in Chile in 2007 (Data source: Comisión Nacional de Energía, Generación Bruta SIC-SING, 2007)

The government supports the production of electricity from renewable energy sources financially. Subsidies are available for solar, wind, biomass, geothermal energy and hydroelectric energy. It guarantees access to the grid for plants of up to 9 MW capacity and discounted access from 9 to 20 MW capacity. These subsidies are not part of the legislation mentioned.

Overview of the systems and the electricity market

System	Yes/No	Information available
Declaration system	Yes	
Trading system (redeeming system)	No	
Tracking system/Guarantee of Origin	No	
Responsible body for registration of the tracking information/databases	No	
Labelling system	No	

Table 10: Overview of the systems in Chile (Source: PwC)

6.8 China

National electricity production

The diagram below shows the energy sources for the gross national electricity production in China for 2006. The small pie chart on the right shows the share in production of each form of renewable electricity in detail.

National legal framework

China's legal framework for regulating the electricity market consists of four regulations. The scope of the first three is national; and the fourth is regional in scope.

First, the Electric Power Law of the People's Republic of China (in Chinese: 中华人民共和国电力法) covers construction, generation, supply and consumption of electric power. Second, the Renewable Energy Law of the People's Republic of China (in Chinese: 中华人民共和国可再生能源法) covers renewable energy popularisation and application, renewable energy electricity price control and cost apportionment. Third, the supervision of the electric power market is covered by the Measures for the Supervision of the Electric Power Market (in

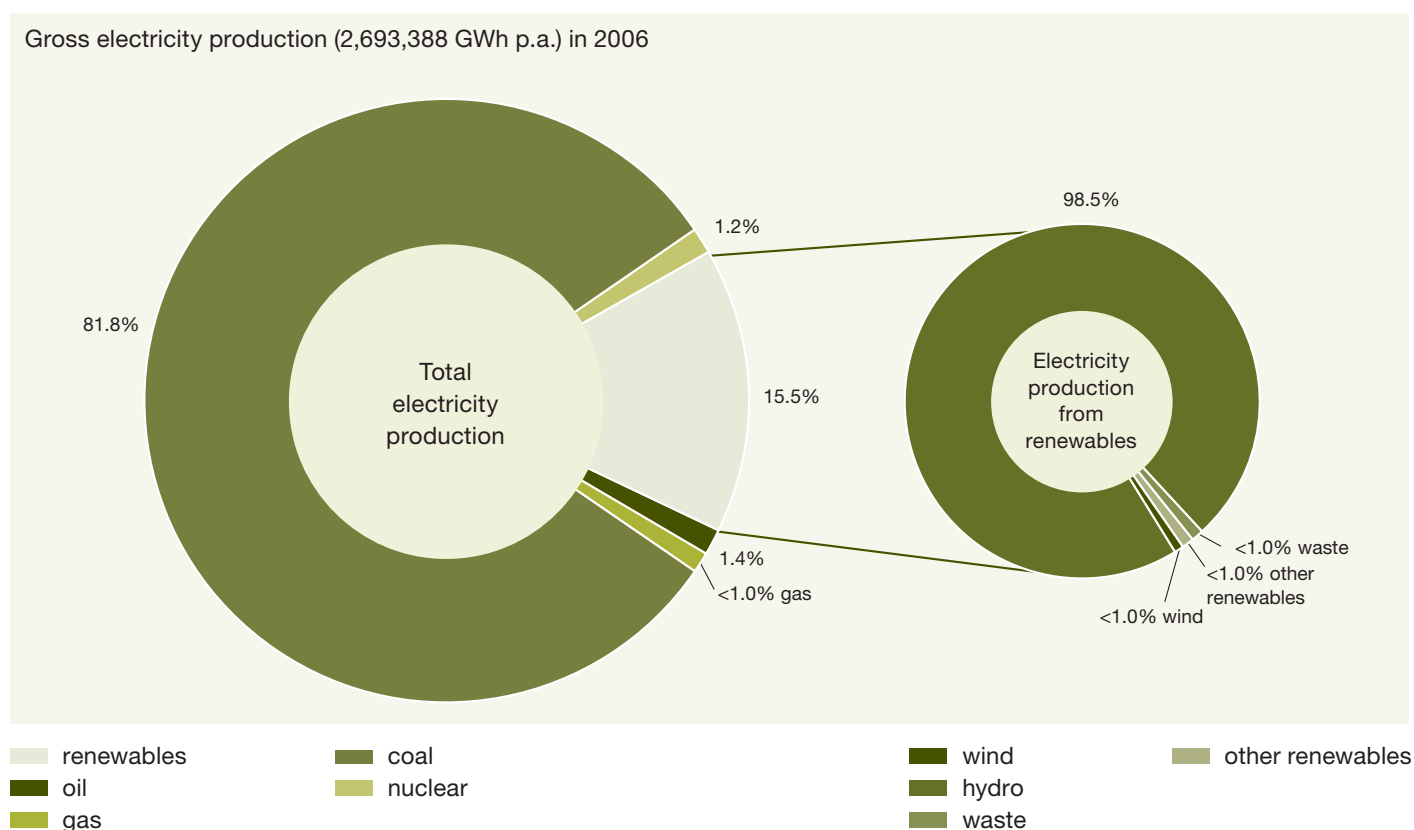


Figure 13: Gross electricity production in China in 2006 (Data source: China Electric Power Press, China Electric Power Statistical Yearbook, 2007)

Chinese: 电力市场监管办法). Fourth, the law Basic Operating Rules for the Electric Power Market (in Chinese: 电力市场运营基本规则) regulates the regional electric power market.

The government financially supports the production of electricity from renewable energy sources. Subsidies are available for solar, wind, biomass, geothermal energy and hydroelectric energy. The grid power price of renewable energy power generation projects is determined by the price authorities of the State Council. The State Council considers whether the project is beneficial to the development and utilisation of renewable energy and whether it is economic and reasonable. The price for grid-connected power shall be published. These subsidies are part of the mentioned legislation (Renewable Energy Law of the People's Republic of China).

Overview of the systems and the electricity market

One of the two Chinese electricity suppliers offers electricity from renewable energy sources. It is the largest electricity supplier. The electricity supplier is responsible for selling and distributing the certified electricity. Currently, this labelled electricity is being sold in Shanghai on a trial basis, but the company focuses on the nationwide market.

System	Yes/No	Information available
Declaration system	No	
Trading system (redeeming system)	State grid, China Southern Power Grid	www.sgcc.com.cn www.csg.cn
Tracking system/Guarantee of Origin	No	
Responsible body for registration of the tracking information/databases	No	
Labelling system	Jade Electricity	www.sh-greenpower.org

Table 11: Overview of the systems in China (Source: PwC)

6.9 Denmark

National electricity production

The diagram below shows the energy sources for the gross national electricity production in Denmark for 2007. The small pie chart on the right shows the share in production of each form of renewable electricity in detail.

National legal framework

The key law regulating the electricity market in Denmark is the Law of Electricity Supply (in Danish: Elforsyningsloven). Its scope is national.

Since 1 July 2004, the European Union has demanded that all electricity consumers must be able to obtain an electricity label from their utility company or electricity trader. In Denmark, the Notice of Declaration of Electricity (in Danish: Elmærkningsbekendtgørelsen), being an order concerning the labelling of electricity, was issued in December 2005 (applicable from 2006). Information about the electricity label must be given at least once a year in connection with the annual statement or with reference to a website.

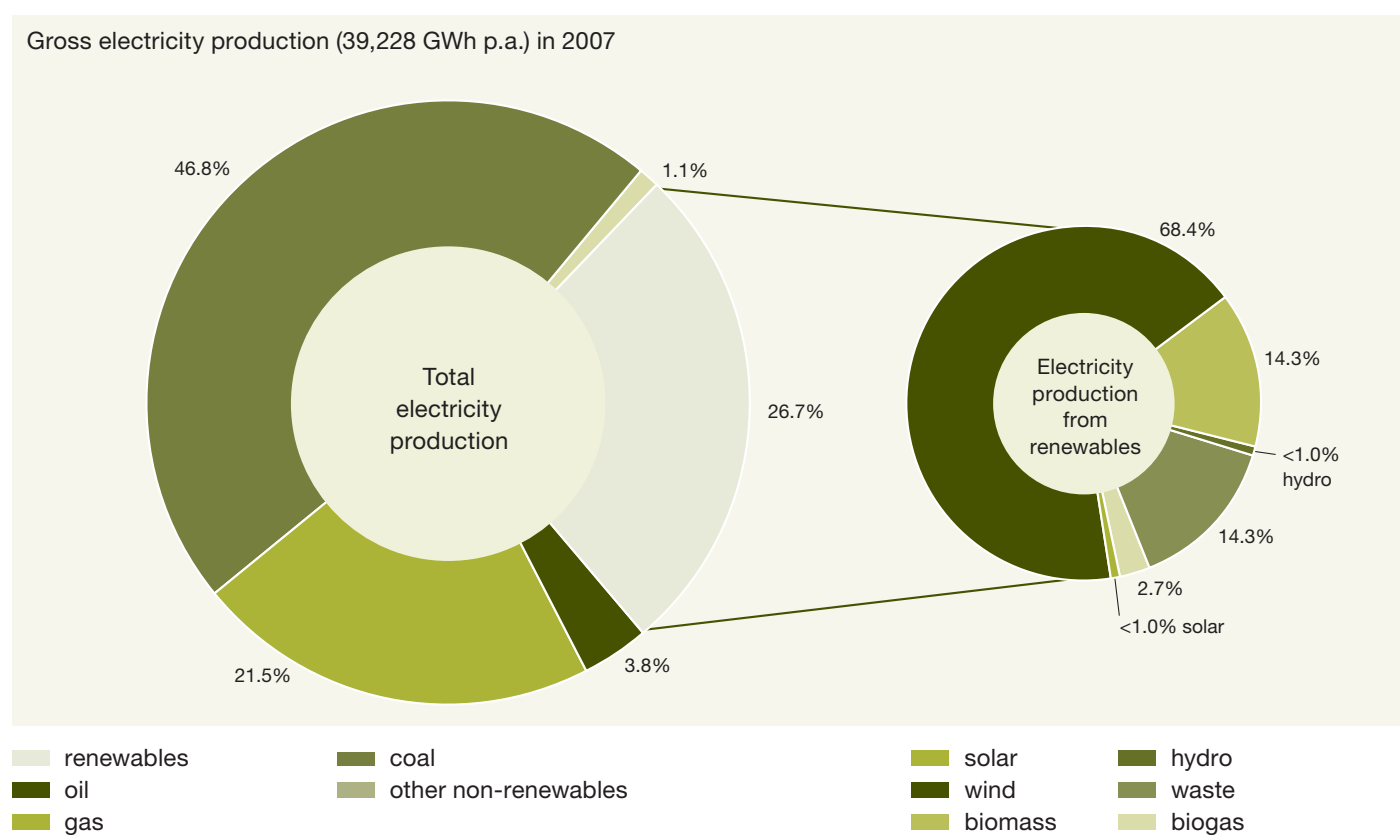


Figure 14: Gross electricity production in Denmark in 2007 (Data source: IEA Online Dataservices, OECD Electricity and Heat Generation – Renewables © OECD/IEA, 2008)

The government supports the production of electricity from renewable energy sources. These subsidies are part of the Law of Electricity Supply and support energy generated from solar, wind, biomass as well as geothermal energy and hydroelectric energy. Overall, there are about 6,000 electricity plants of which approximately 5,400 are wind turbines (per 1 January 2005). Some plants receive subsidies depending on the fuel type, the size and the age of the plant. The tariff for the producer is fixed. Therefore, subsidies are given as a premium to the market price. All subsidies are passed on to the consumer as an equal Public Service Obligation (PSO) tariff on their total consumptions. At the beginning of 2005 the PSO tariff was approximately 11 øre per kWh.

Overview of the systems and the electricity market

In Denmark, 10 out of 50 electricity suppliers offer certified electricity from renewable energy sources. The electricity supplier is responsible for selling and distributing the certified electricity. The Danish electricity market is liberalised and each end consumer is free to choose an electricity provider. Depending on the electricity supplier the certified electricity products can be ordered by phone or online.

System	Yes/No	Information available
Declaration system	Yes	
Trading system (redeeming system)	RECS	www.recs.org/recs/themembers.asp?country=denmark www.energies-renouvelables.org
Tracking system/Guarantee of Origin	Yes	Applicable for electricity generated from any energy sources
Responsible body for registration of the tracking information/databases	Energinet	www.energinet.dk
Labelling system	Bra Miljöval	See relevant page in this survey

Table 12: Overview of the systems in Denmark (Source: PwC)

6.10 Finland

National electricity production

The diagram below shows the energy sources for the gross national electricity production in Finland for 2007. The small pie chart on the right shows the share in production of each form of renewable electricity in detail.

National legal framework

The legal framework of Finland for regulating the electricity market consists of three regulations; all are national in scope.

First, the Electricity Market Law (in Finnish: Sähkömarkkinlaki 386/1995), aims to support a good quality supply with modest pricing by ensuring viable functioning competition in electricity production and sales as well as maintaining modest and equal service principles in distribution networks. Second, the Law of Assurance and Disclosure of the Origin of Electricity (in Finnish: Laki sähkön alkuperän varmentamisesta ja ilmoittamisesta 1129/2003) addresses procedures of assurance and disclosure of production technologies and energy

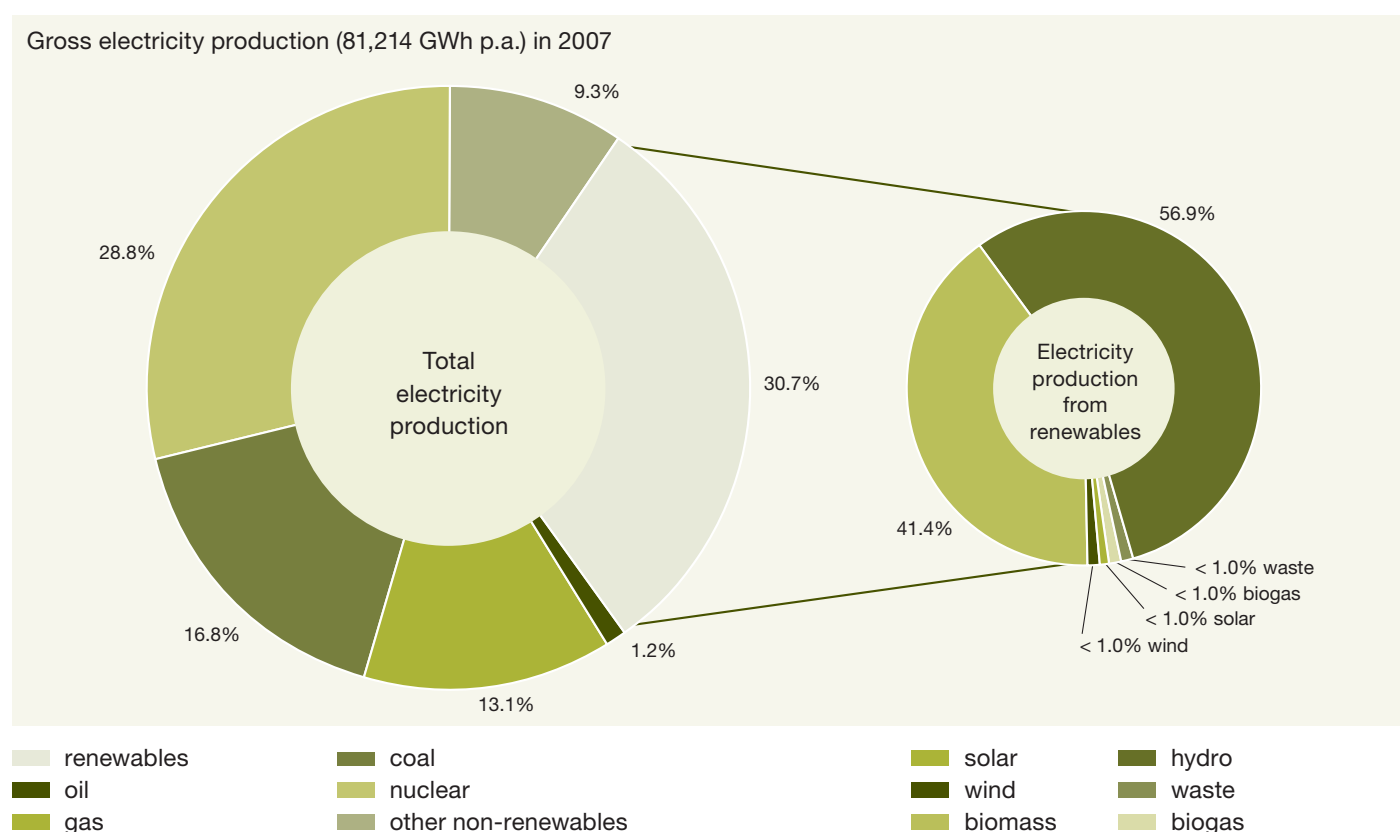


Figure 15: Gross electricity production in Finland in 2007 (Data source: IEA Online Dataservices, OECD Electricity and Heat Generation – Renewables © OECD/IEA, 2008)

sources in specific decrees. Third, the Governmental Decrees on Assurance and Disclosure of Electricity Origin (in Finnish: Valtioneuvoston asetukset sähkön alkuperän varmentamisesta (1357/2003) ja ilmoittamisesta 233/2005) specifies in detail the regulations on assurance and disclosure of origin of the electricity.

The Finnish government does not yet support the production of electricity from renewable energy sources. This is however likely to change in 2010.

Overview of the systems and the electricity market

In Finland, 13 out of 70 electricity suppliers offer certified electricity from renewable energy sources. The electricity supplier and the labelling body are responsible for selling and distributing the certified electricity. There are two large certified international suppliers – Fortum and Vattenfall – the others are comparatively small companies with mainly domestic market focus. Depending on the electricity supplier certified electricity products can be ordered via product brochures, phone or online.

System	Yes/No	Information available
Declaration system	Yes	
Trading system (redeeming system)	RECS	www.recs.org/recs/themembers.asp?country=finland
Tracking system/Guarantee of Origin	Yes	Applicable for electricity generated from renewable energy sources
Responsible body for registration of the tracking information/databases	No	
Labelling system	Norppaenergia	See relevant page in this survey

Table 13: Overview of the systems in Finland (Source: PwC)

Figure 16: Gross electricity production in France in 2007 (Data source: IEA Online Dataservices, OECD Electricity and Heat Generation – Renewables © OECD/IEA, 2008)

au développement du service public de l'électricité) aims at recompensating the price of electricity produced by renewable energy and cogeneration.

The government supports the production of electricity from renewable energy sources financially. Subjects of these subsidies are: solar, wind, biomass, geothermal energy and hydroelectric energy. These subsidies are part of Article 10 of the Law Nr. 2000-108. The law does not explicitly exclude the selling of subsidised electricity in the voluntary market.

Overview of the systems and the electricity market

In France, all six electricity suppliers offer certified electricity from renewable energy sources. The electricity suppliers are responsible for sales and distribution. Depending on the electricity supplier the products can either be ordered via product brochures, by phone or online.

System	Yes/No	Information available
Declaration system	Yes	
Trading system (redeeming system)	RECS (Observ'ER is responsible for the French RECS system for the trade of electricity from renewable resources)	www.recs.org/recs/themembers.asp?country=france www.energies-renouvelables.org
Tracking system/Guarantee of Origin	Yes	
Responsible body for registration of the tracking information/databases	CLER Coordination committee for renewable energies	www.cler.org
Labelling system	EVE – Electricité Verte TÜV SÜD Labels	See relevant pages in this survey

Table 14: Overview of the systems in France (Source: PwC)

6.12 Germany

National electricity production

The diagram below shows the energy sources for the gross national electricity production in Germany for 2007. The small pie chart on the right shows the share in production of each form of renewable electricity in detail.

National legal framework

Germany's legal framework for regulating the electricity market consists of four regulations; all are national in scope.

First, the Renewable Energy Act (in German: Erneuerbare Energien Gesetz, EEG) regulates feed-in tariffs for electricity from renewable energy sources. Second, the Renewable Energy Business Act (in German: Energiewirtschaftsgesetz EnWG) covers the security of supply of electricity and natural gas, the regulation of electricity and natural gas grids to secure competition in the energy market, and the implementation of European law. Third, the Combined Heat and Power Act (in German: Kraft-Wärme-Kopplungsgesetz, KWK-G) has the objective of protecting and modernising combined heat

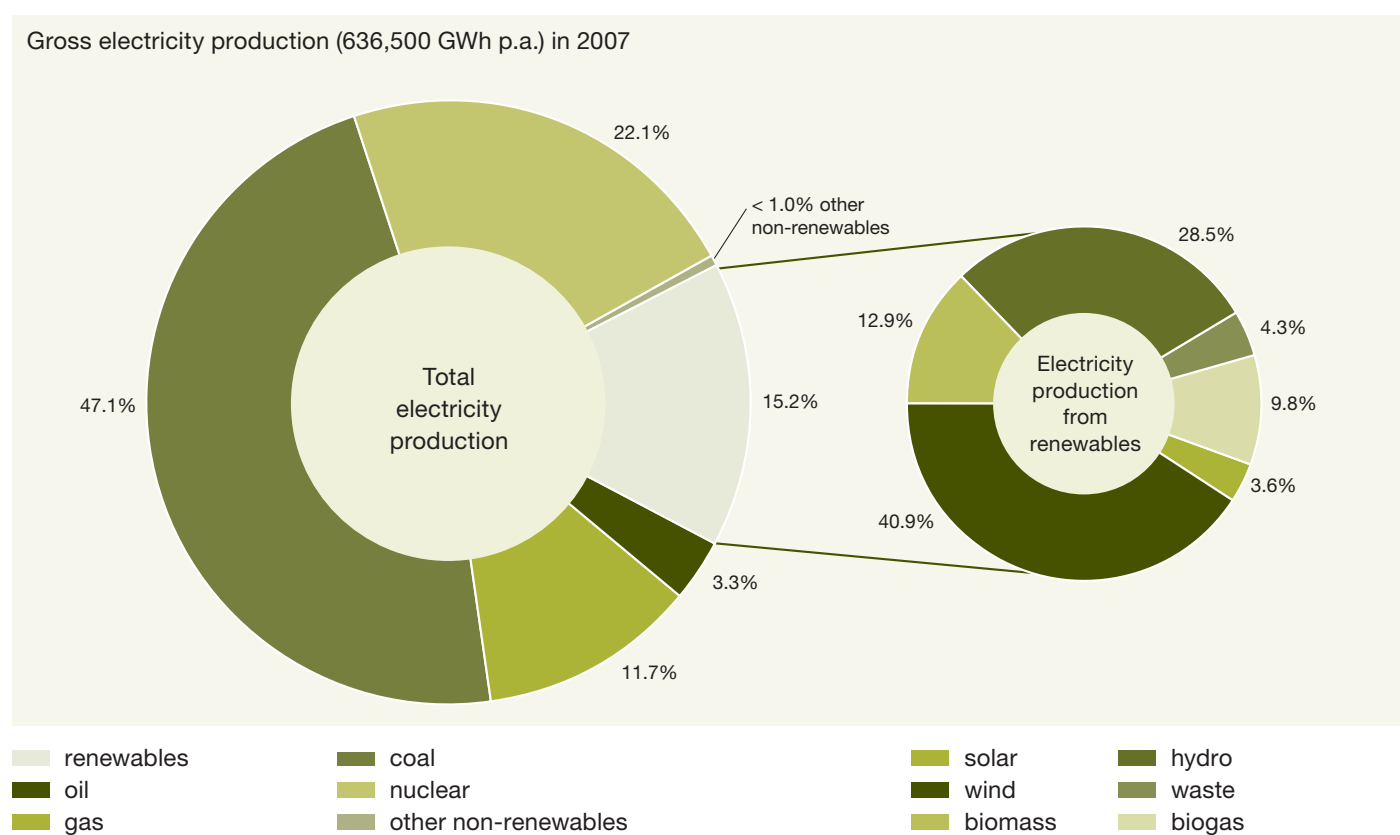


Figure 17: Gross electricity production in Germany in 2007 (Data source: IEA Online Dataservices, OECD Electricity and Heat Generation – Renewables © OECD/IEA, 2008)

and power (CHP) plants and to develop power generation in small CHP units, as well as in fuel cells. Fourth, the German Grid Code and Access Code; Yardstick-Regulation Code (in German: Stromnetzentgeltverordnung sowie Stromzugangsverordnung und Anreizregulierungsverordnung) regulates methods for calculating fees for using electricity grids.

The government financially supports the production of electricity from renewable energy sources. Subjects of the subsidies are: solar, wind, biomass, geothermal energy and hydro-electric energy. These subsidies are part of the Renewable Energy Act. The law prohibits to sell subsidised electricity in the voluntary market.

Overview of the systems and the electricity market

In Germany all electricity suppliers deliver electricity from renewable energy sources. Mostly it is part of the renewable quota that every supplier in Germany is obliged to purchase. Some of the suppliers (including major suppliers) deliver certified energy. The electricity supplier is responsible for selling and distributing the certified electricity. The most common trading certificate is the RECS certificate. Certified electricity products can be ordered with product brochures, by phone or online. There are specialised regional suppliers of certified electricity and specialised national suppliers.

System	Yes/No	Information available
Declaration system	Yes	
Trading system (redeeming system)	RECS Deutschland e.V; issuing body Öko-Institut)	www.recs.org/recs/themembers.asp?country=germany www.oeko.de
Tracking system/Guarantee of Origin	Yes	Applicable for electricity generated from renewable energy sources.
Responsible body for registration of the tracking information/databases	Bundesverband der Energie und Wasserwirtschaft (BDEW)	www.bdew.de
Labelling system	ok-power Öko-Strom Grüner Strom Label TÜV Nord TÜV SÜD	See relevant pages in this survey

Table 15: Overview of the systems in Germany (Source: PwC)

6.13 Hong Kong

National electricity production

There is no data available for electricity production in Hong Kong.

National legal framework

In Hong Kong no legal framework for regulating the electricity market was identified.

The government does not financially support the production of electricity from renewable energy sources.

Nevertheless there is a form of subsidy as the grid price for renewable electricity is determined by the price authorities of the State Council. The State Council can therefore support renewable electricity through favourable price setting if considered necessary and economical (based on the progress of development and utilisation of renewable energy).

Overview of the systems and the electricity market

System	Yes/No	Information available
Declaration system	No	
Trading system (redeeming system)	No	
Tracking system/Guarantee of Origin	No	
Responsible body for registration of the tracking information		
Labelling system	No	

Table 16: Overview of the systems in Hong Kong (Source: PwC)

6.14 Hungary

National electricity production

The diagram below shows the energy sources for the gross national electricity production in Hungary for 2007. The small pie chart on the right shows the share in production of each form of renewable electricity in detail.

National legal framework

Hungary's legal framework for regulating the electricity market consists of three regulations, all are national in scope.

First, the Act LXXXVI of 2007 on Electricity (in Hungarian: Törvény a villamos energiáról) regulates the purchasing obligation (= feed-in tariff) regime concerning energy sources, generation procedures, nominal generating capacity, the efficiency and cost-effectiveness of energy conversion processes, and the time of construction of power plants. Second,

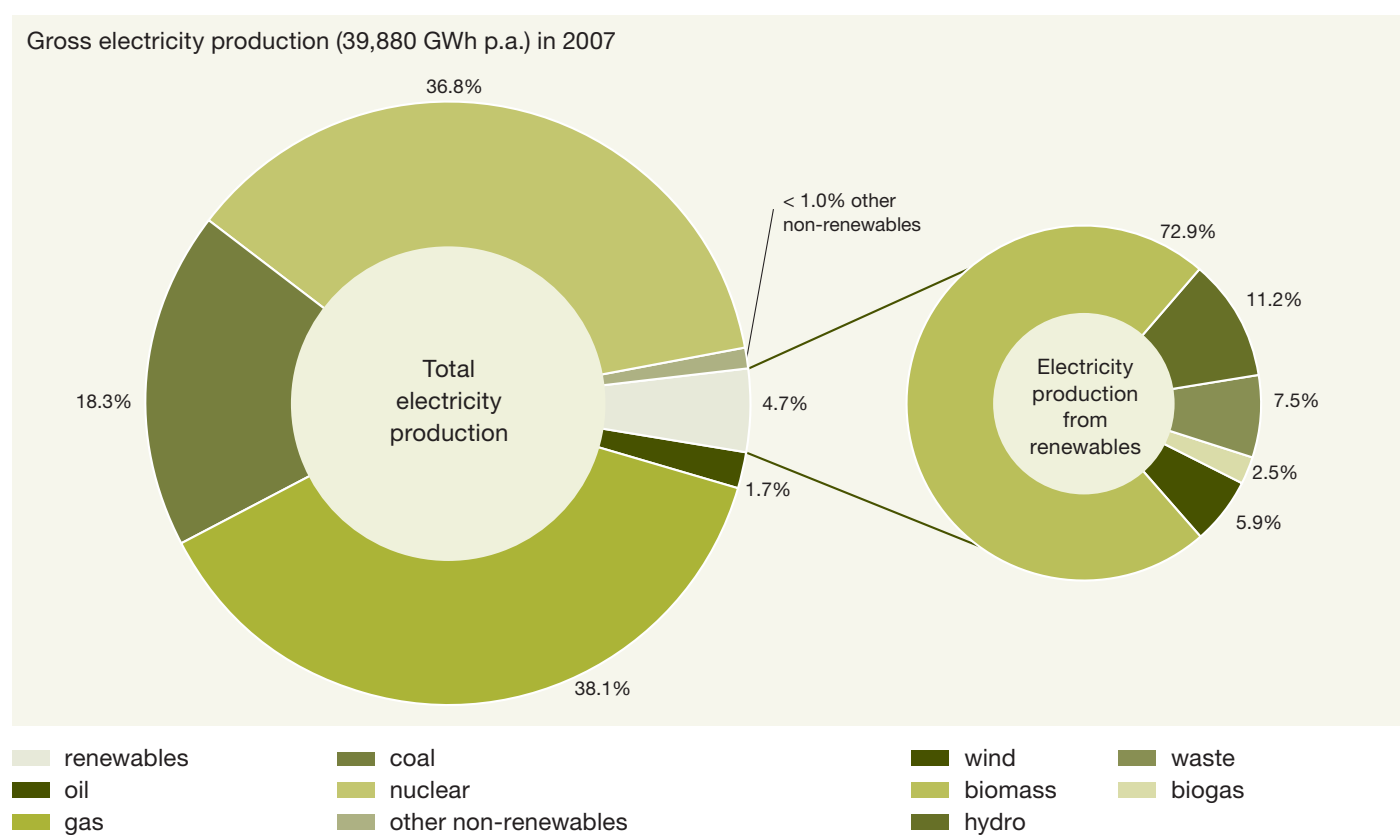


Figure 18: Gross electricity production in Hungary in 2007 (Data source: IEA Online Dataservices, OECD Electricity and Heat Generation – Renewables © OECD/IEA, 2008)

The Governmental Decree No 389/2007. (XII. 23.) on the obligatory off-take and purchase price of electricity generated from waste or from renewable energy sources, or by CHP (in Hungarian: Korm. rendelet a megújuló energiaforrásból vagy hulladékból nyert energiával termelt villamos energia, valamint a kapcsolatosan termelt villamos energia kötelező átvételéről és átvételi áráról). This sets the rules for purchasing obligations, tariffs for electricity from renewable energy sources and the tracking system. The third regulation is the GKM Decree 109/2007 on the distribution of electricity under the off-take obligation by the TSO and on calculation of such distribution fees (in Hungarian: GKM rendelet az átvételi kötelezettség alá eső villamos energiának az átviteli rendszerirányító által történő szétosztásáról és a szétosztás során alkalmazható árak meghatározásának módjáról). This Decree regulates the conditions for determining electricity production schedules, renewable energy sources and obliges the TSO to levy surcharges and provide information.

The Hungarian government supports the production of electricity from renewable energy sources with subsidies that are part of the above mentioned legislation. Subjects of the subsidies are: solar, wind, biomass and hydroelectric energy. This model is a feed-in tariff system determined according to the type of energy source, the time of day of production (peak, off-peak) and the capacity of the plants. The preferential tariff period is not fixed but is determined for each power plant separately during the grid connection authorisation process of the plant. The plants are considered individually to guarantee that they are not over subsidised. The system is financed through a levy on the electricity price paid by consumers.

Overview of the systems and the electricity market

None of the electricity suppliers offer certified electricity from renewable energy sources.

System	Yes/No	Information available
Declaration system	No	
Trading system (redeeming system)	No	
Tracking system/Guarantee of Origin	Yes	Applicable for electricity generated from renewable sources
Responsible body for registration of the tracking information/databases	Energy Center Kht. (Energy Center Information Agency for Energy Efficiency and Environmental Protection Public Company), Budapest	www.energiakozpont.hu
Labelling system	No	

Table 17: Overview of the systems in Hungary (Source: PwC)

6.15 India

National electricity production

The diagram below shows the energy sources for the gross national electricity production in India for 2004. The small pie chart on the right shows the share in production of each form of renewable electricity in detail.

National legal framework

India's legal framework for regulating the electricity market consists of one national and three regional regulations.

The national Electricity Act 2003 covers the generation, transmission and distribution of electricity. The three regional legislations are: The Terms and Conditions for Determination of Tariffs which covers tariff determination for generating stations, the Open Access Regulations that regulate the provision of access to the transmission system for transmitting electricity and the Power Purchase and Procurement Process which are guidelines for distribution licences for procurement of electricity.

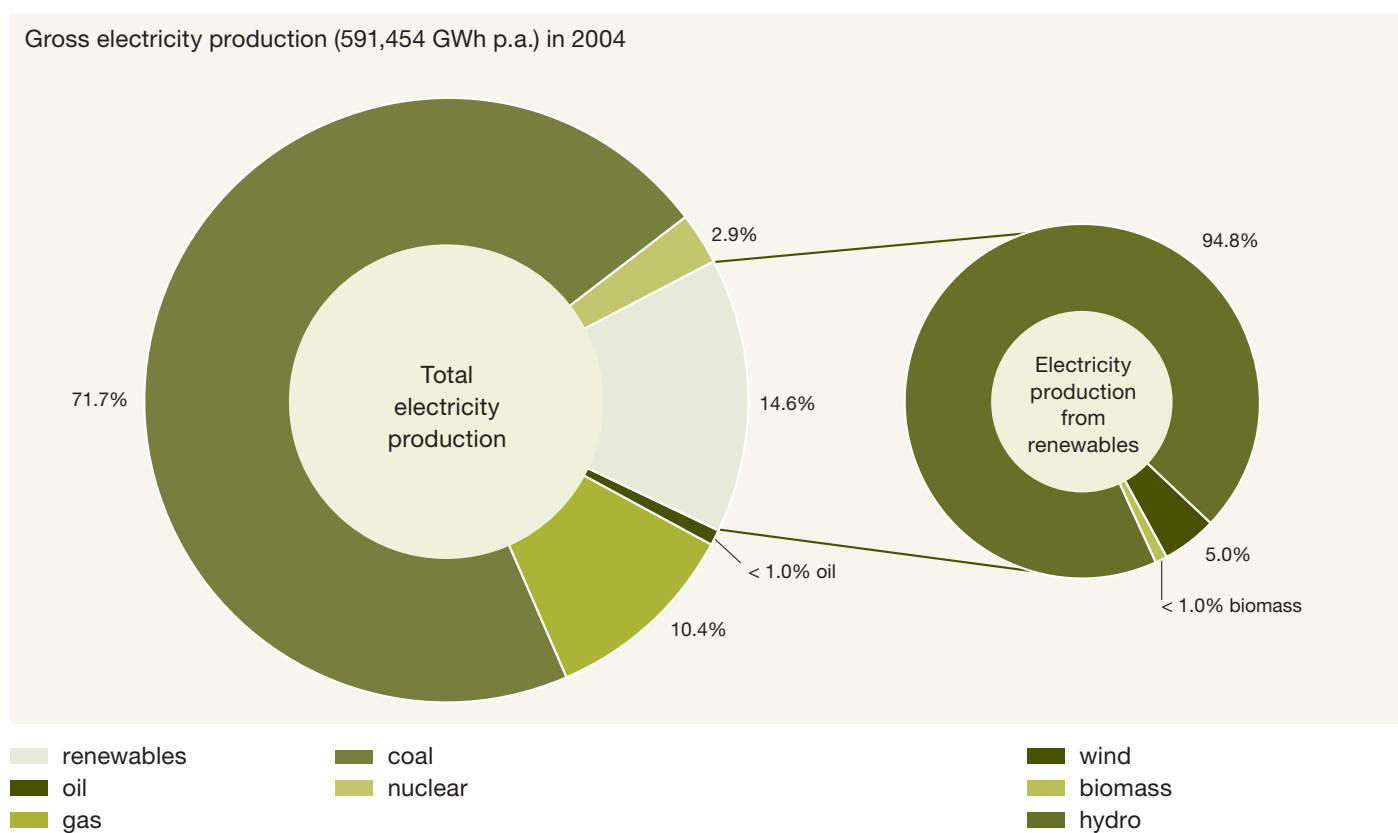


Figure 19: Gross electricity production in India in 2004 (Data source: Central Electricity Authority, All India Electricity Statistics, General Review 2006)

The government supports the production of electricity from renewable energy sources financially. Subsidies are available for solar, wind and hydroelectric energy. These subsidies are not part of the legislation mentioned.

Overview of the systems and the electricity market

System	Yes/No	Information available
Declaration system	No	
Trading system (redeeming system)	Power Trading Corporation ("PTC") Tata Power Trading Company Limited ("TPTCL") Adani Trading Company	www.ptcindia.com www.tatapowertrading.com
Tracking system/Guarantee of Origin	Yes	
Responsible body for registration of the tracking information/databases	NRLDC, SRLDC, WRLDC, ERLDC	www.nrldc.org
Labelling system	No	

Table 18: Overview of the systems in India (Source: PwC)

6.16 Indonesia

National electricity production

The diagram below shows the energy sources for the gross national electricity production in Indonesia for 2007. The small pie chart on the right shows the share in production of each form of renewable electricity in detail.

National legal framework

The legal framework for regulating the electricity market in Indonesia consists of three pieces of legislation, all national in scope.

First, Law No. 20/2002 Electricity Bill regulates electrical power. Second, Government Decree No. 3/2005 Regulation on Electricity Supply and Utilisation regulates the supply and utilisation of electricity. Third, Geothermal Law No. 27/2003 governs the management and development of geothermal energy sources for direct and indirect use.

The Indonesian government does not support the production of electricity from renewable energy sources.

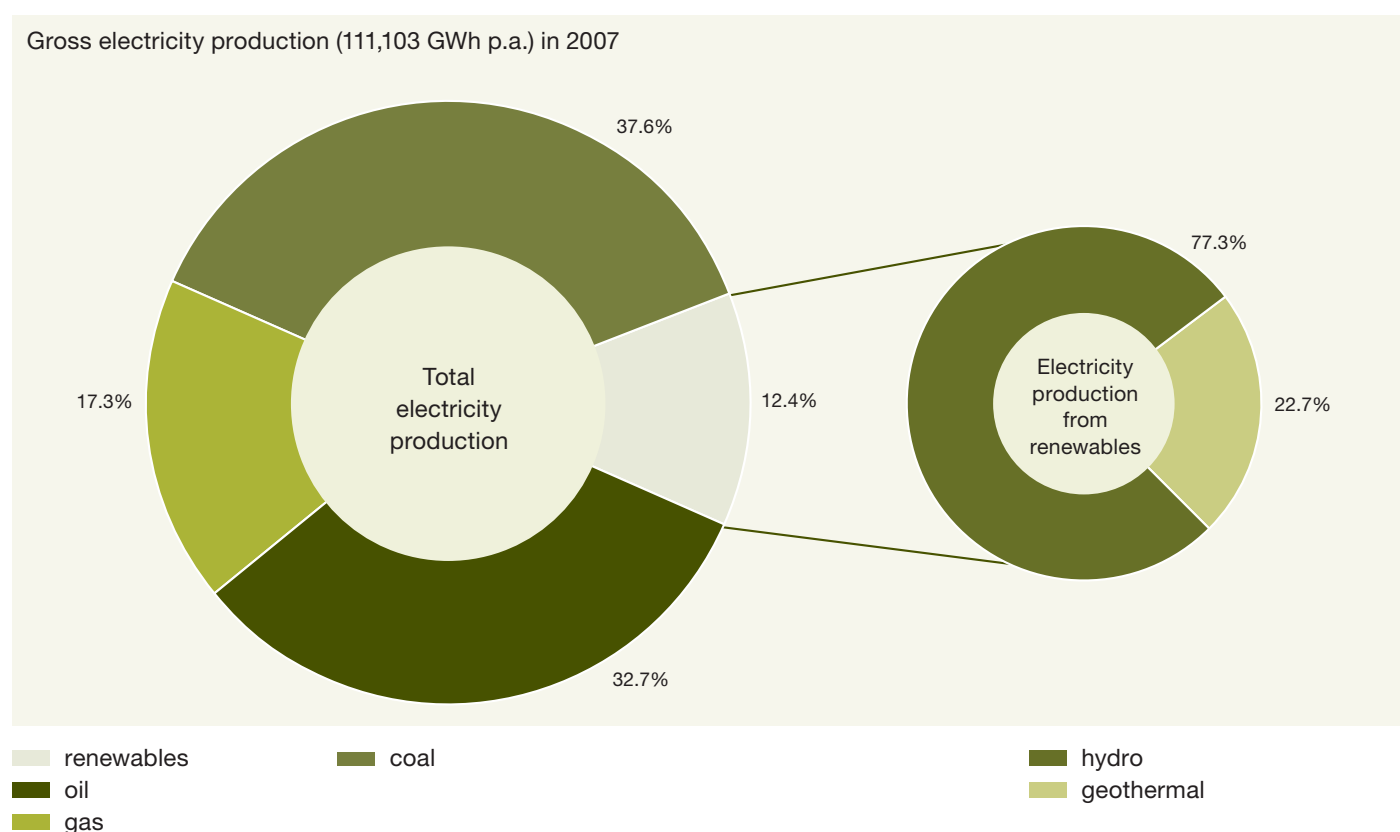


Figure 20: Gross electricity production in Indonesia in 2007 (Data source: PT PLN [Persero], Annual Report 2007)

Overview of the systems and the electricity market

No electricity supplier in Indonesia offers certified electricity from renewable energy sources.

System	Yes/No	Information available
Declaration system	No	
Trading system (redeeming system)	No	
Tracking system/Guarantee of Origin	No	
Responsible body for registration of the tracking information/databases		
Labelling system	No	

Table 19: Overview of the systems in Indonesia (Source: PwC)

6.17 Ireland

National electricity production

The diagram below shows the energy sources for the gross national electricity production in Ireland for 2007. The small pie chart on the right shows the share in production of each form of renewable electricity in detail.

National legal framework

Ireland's legal framework for regulating the electricity market consists of three regulations; all are national in scope.

First, the Electricity Regulation Act, 1999 provides the legal framework for the Commission for Energy Regulation (CER). Second, the Gas Act (Interim Regulation), 2002 expanded the scope of CER's responsibilities. Third, the objective of the Statutory Instrument (SI) 425 of 2004 and SI 60 of 2005 is to transpose EU legislation into Irish law.

The Irish government supports the production of electricity from renewable energy sources with subsidies that are not part of the legislation mentioned above. The subsidies are in The Renewable Energy Feed In Tariff (REFIT) Programme, and cover wind, biomass and hydroelectric energy.

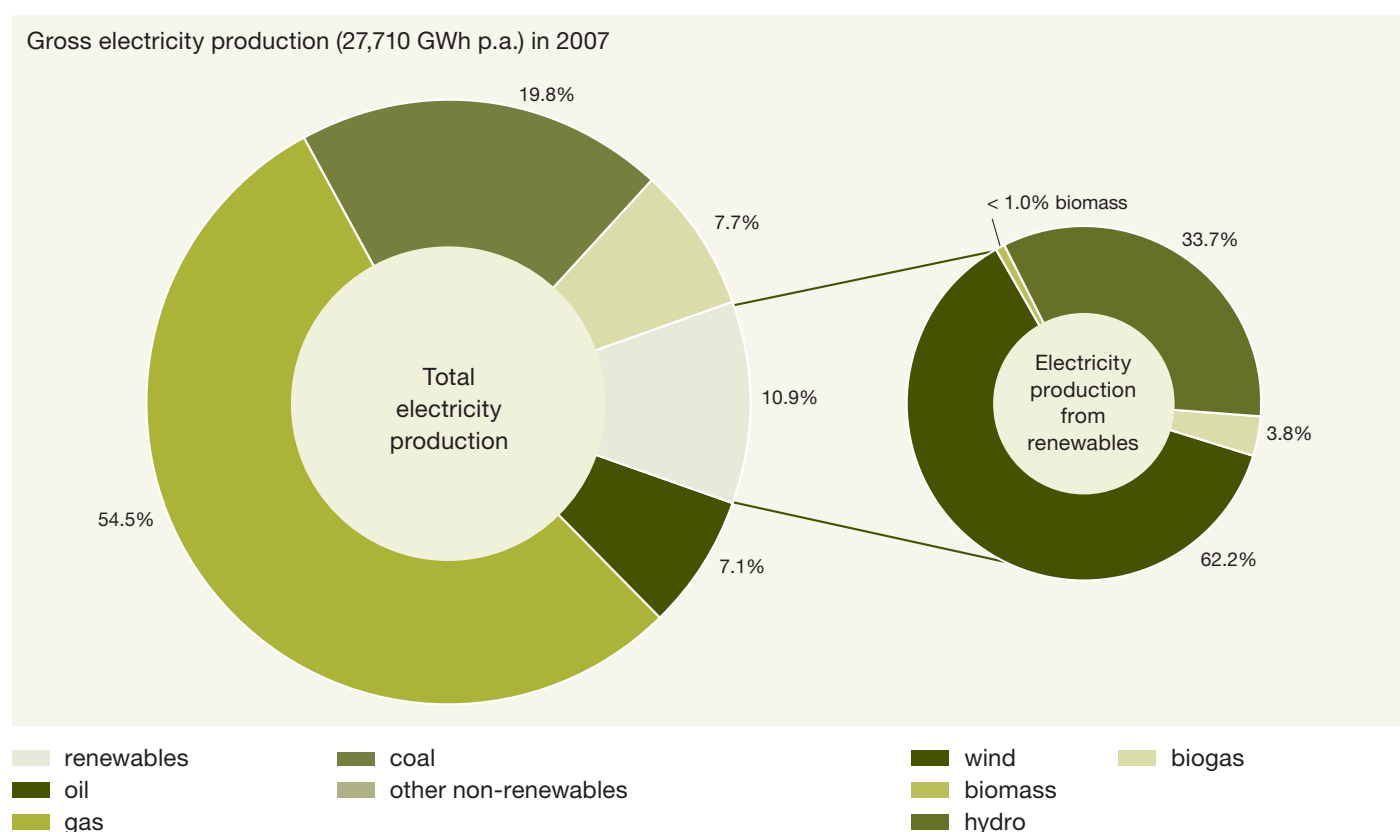


Figure 21: Gross electricity production in Ireland in 2007 (Data source: IEA Online Dataservices, OECD Electricity and Heat Generation – Renewables © OECD/IEA, 2008)

Overview of the systems and the electricity market

None of the electricity suppliers offer certified electricity from renewable energy sources.

System	Yes/No	Information available
Declaration system	Yes	
Trading system (redeeming system)	RECS	www.recs.org/recs/themembers.asp?country=ireland
Tracking system/Guarantee of Origin	No	
Responsible body for registration of the tracking information/databases		
Labelling system	No	

Table 20: Overview of the systems in Ireland (Source: PwC)

6.18 Italy

National electricity production

The diagram below shows the energy sources for the gross national electricity production in Italy for 2007. The small pie chart on the right shows the share in production of each form of renewable electricity in detail.

National legal framework

First, the basis for national regulation of the electricity market in Italy is the Ministerial Decree of 19 December 2003 (Electricity Market-Green Certificates) (in Italian: Testo integrato della disciplina del mercato elettrico del 19 dicembre 2003). It contains rules for the electricity market. Second, the objective of the Legislative Decree No 387 of 29 December 2003 (in Italian: Decreto Legislativo 29 dicembre 2003, n. 387) is to promote renewables by a feed-in tariff. Third, rules on renewable trading certificates includes the Ministerial Decree of 24 October 2005 (Green Certificates) (in Italian: Decreto Ministero Attività Produttive 24/10/2005), and the Directive for the Regu-

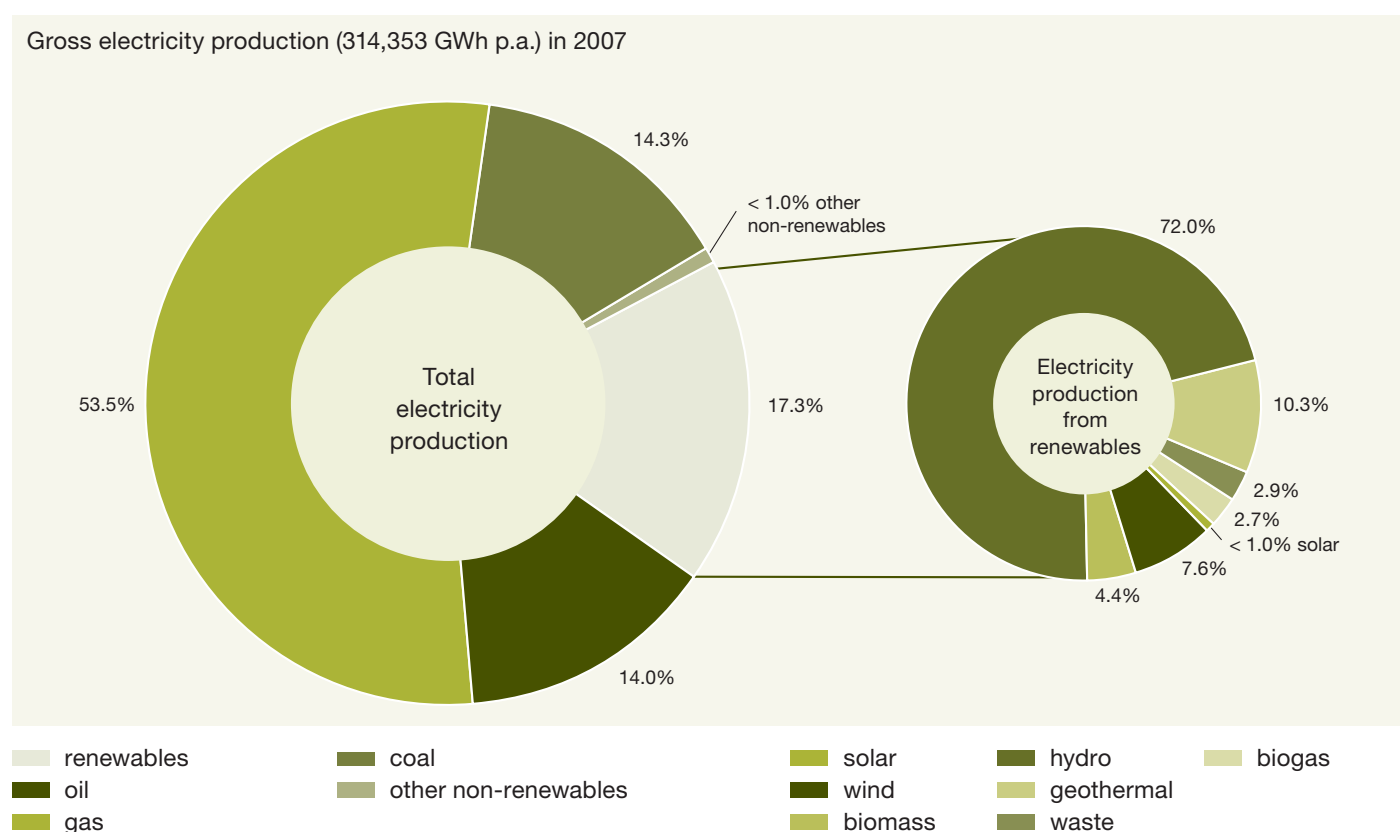


Figure 22: Gross electricity production in Italy in 2007 (Data source: IEA Online Dataservices, OECD Electricity and Heat Generation – Renewables © OECD/IEA, 2008)

lation of Emission of Green Certificates in Energy Production of Article 1, 71 of the law No 239/2004, dated 23 August 2004 (in Italian: Direttive per la regolamentazione dell'emissione dei certificati verdi alle produzioni di energia di cui all'articolo 1, comma 71, della legge 23 agosto 2004, n. 239).

The government supports the production of electricity from renewable energy sources financially. Subject of these subsidies are: solar, wind, biomass, geothermal energy and hydroelectric energy. The subsidies are part of the above-mentioned Legislative Decree No 387 of 29 December 2003. Legislation is changing quickly so that there are frequent amendments made to the above mentioned legislation.

Overview of the systems and the electricity market

In Italy, the electricity supplier is responsible for the selling and distributing the certified electricity.

System	Yes/No	Information available
Declaration system	No	
Trading system (redeeming system)	RECS	www.recs.org/recs/themembers.asp?country=italy
Tracking system/Guarantee of Origin	Guarantee of Origin (Garanzia d'origine)	Applicable for electricity generated from renewable energy sources
Responsible body for registration of the tracking information/databases	Gestore Servizi Elettrici	www.grtn.it/ita/index.asp
Labelling system	100% energia verde TÜV SÜD labels	See relevant pages in this survey

Table 21: Overview of the systems in Italy (Source: PwC)

6.19 Japan

National electricity production

The diagram below shows the energy sources for the gross national electricity production in Japan for 2007. The small pie chart on the right shows the share in production of each form of renewable electricity in detail.

National legal framework

The legal framework for national regulation of the electricity market in Japan is The Act on the Promotion of New Energy Usage (in Japanese: 新エネルギー利用等の促進に関する特別措置法). The objectives of the law are to ensure the security of supply and promote the use of new energy with a national scope. This legislation originally focused on the replacement of fossil fuels and did not directly aim to reduce greenhouse gas emissions. Another regulation for green electricity is the Special Measures Law Concerning the Use of New Energy by Electric Utilities (RPS Law). This law contains the Renewables

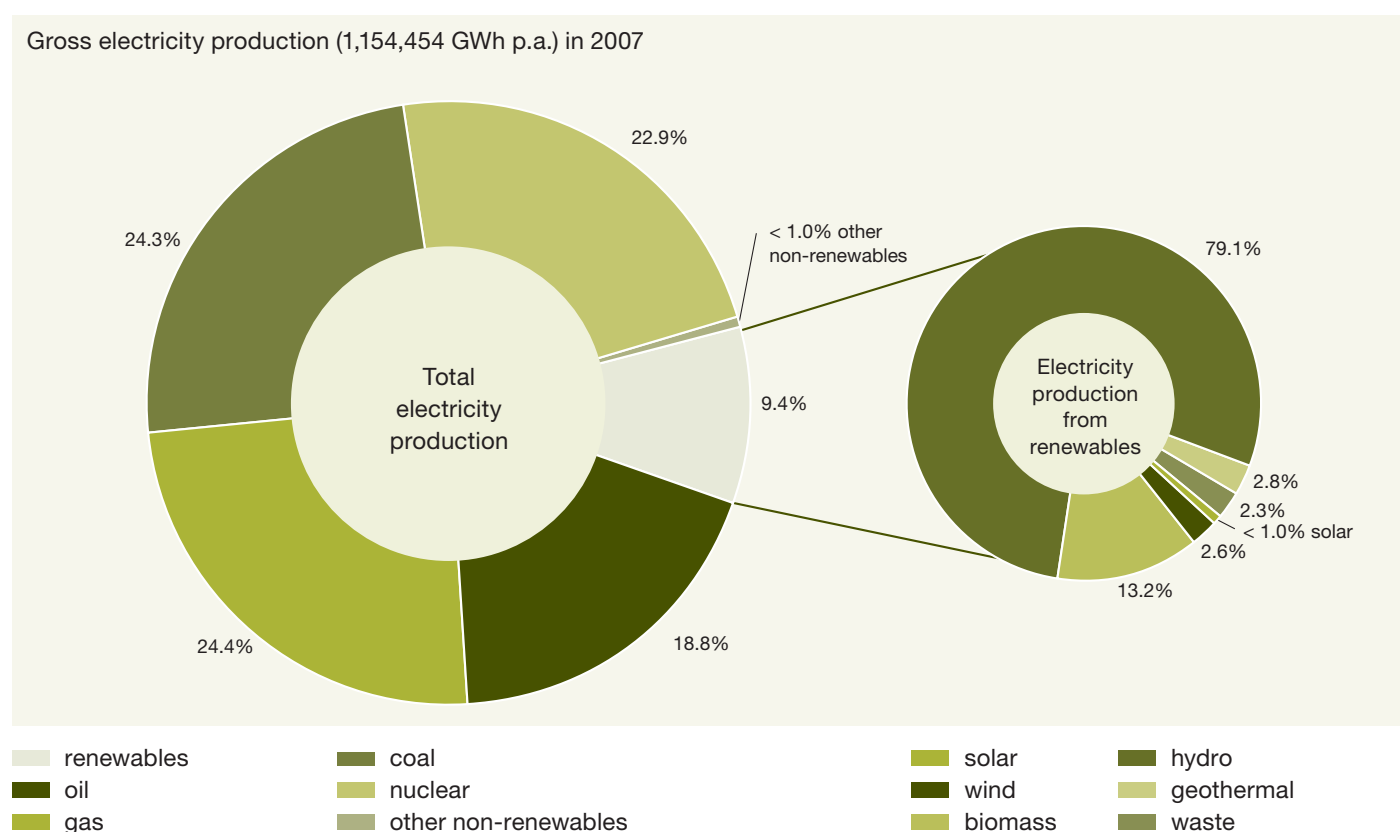


Figure 23: Gross electricity production in Japan in 2007 (Data source: IEA Online Dataservices, OECD Electricity and Heat Generation – Renewables © OECD/IEA, 2008)

Portfolio Standard scheme which forces major power producers to use a certain amount of renewable electricity. This amount is set annually according to the company's sales, the minimum being at least the amount imposed as an annual obligation since April 2003. As the green power generated under this law by major power producers is compulsory, it is not deemed additional in the label scheme mentioned earlier.

The government financially supports the production of electricity from renewable energy sources. These subsidies are not part of the legislation mentioned. Implementation of measures, such as subsidies, is being done at national, prefectural, and city level. However, the authorities do not directly aim to facilitate the green power labelling system because this system is operated on a private and voluntary basis.

Overview of the systems and the electricity market

In Japan, 83 out of 121 electricity suppliers offer certified electricity from renewable energy sources. The renewable energy is produced by small green power facilities, which sell it to primary electricity suppliers. From there it is distributed to end consumers who receive a Certification of Green Power.

System	Yes/No	Information available
Declaration system	No	
Trading system (redeeming system)	Japan Natural Energy Company Ltd.	www.natural-e.co.jp/english/index.html
Tracking system/Guarantee of Origin	Japan Natural Energy Company Ltd. and The Green Energy Certification Center (Former Green Power Certification Council, Japan)	www.natural-e.co.jp eneken.iecej.or.jp/greenpower
Responsible body for registration of the tracking information/databases	See above	See above
Labelling system	Green Power Certification System	See relevant page in this survey

Table 22: Overview of the systems in Japan (Source: PwC)

6.20 Mexico

National electricity production

The diagram below shows the energy sources for the gross national electricity production in Mexico for 2007. The small pie chart on the right shows the share in production of each form of renewable electricity in detail.

National legal framework

Mexico's legal framework for regulating the electricity market consists of three regulations; all are national in scope.

First, the Electric Energy Public Service Law 1975 (in Spanish: Ley del Servicio Público de Energía Eléctrica [LSPEE]) establishes private participation in electricity generation as subject to approval from the CFE (Comisión Federal de Electricidad/Federal Electricity Committee). Second, the Federal Code on Public Administration (in Spanish: Ley Orgánica de la Administración Pública Federal) regulates the Department of Energy regarding business performance. Third, the Energy

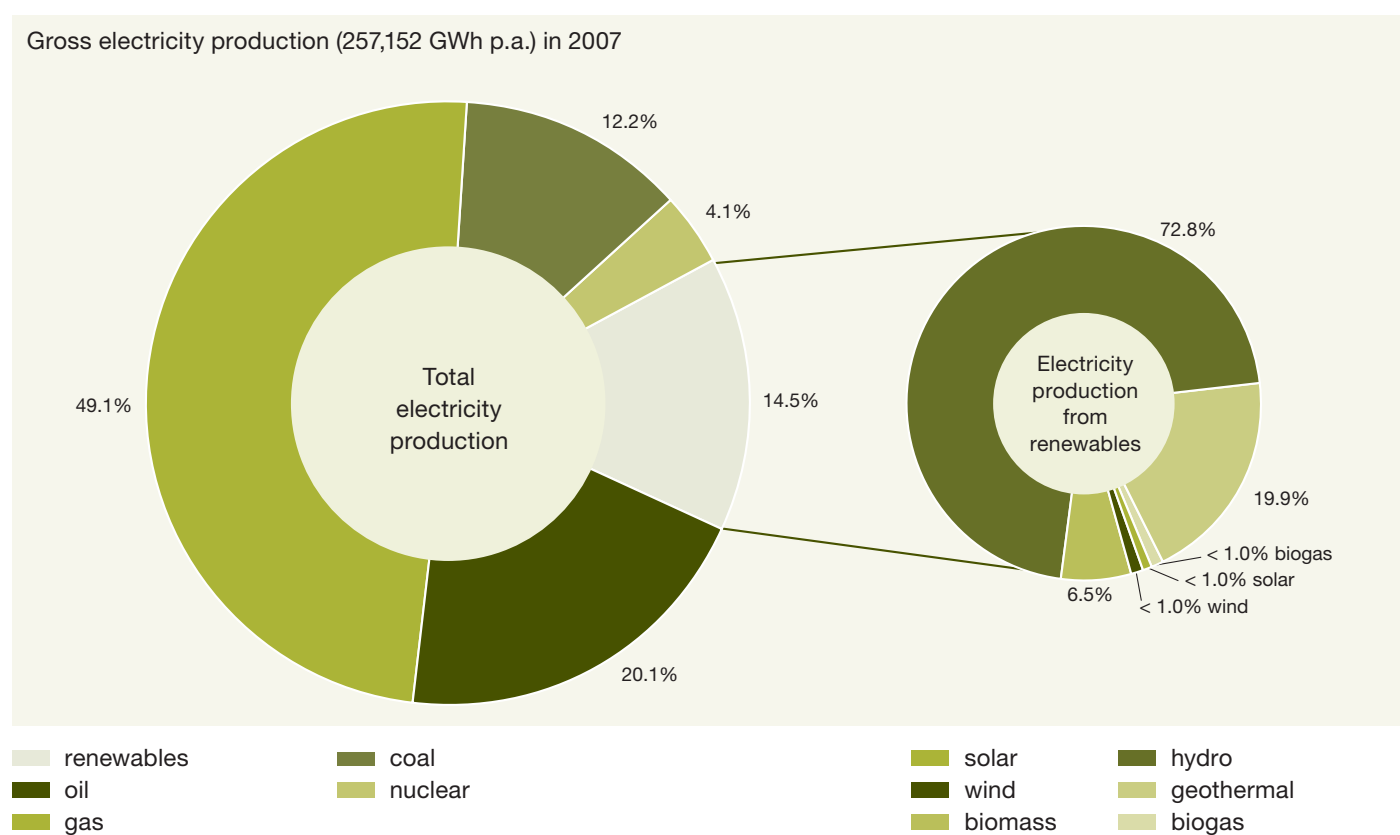


Figure 24: Gross electricity production in Mexico in 2007 (Data source: IEA Online Dataservices, OECD Electricity and Heat Generation – Renewables © OECD/IEA, 2008)

Regulation Committee Law (in Spanish: Ley de la Comisión de Reguladora de Energía) regulates activities and performance of the committee.

The Mexican government financially supports the production of electricity from renewable energy sources. Subjects of the subsidies are: solar, wind, biomass, geothermal energy, hydroelectric energy. This regulation for renewable energy was adopted in 2001 with 3 main topics: first, surplus energy, second, shortfall energy and third, capacity provided to the national electricity grid (Sistema Eléctrico Nacional (SEN)). The instruments to regulate the mentioned topics are: An Interconnection Contract establishing terms and conditions

for interconnection among SEN, renewable energy sources and consumers and an Electric Energy Transmission Service Agreement defining the transport of renewable electricity from the production site to the consumer centres. These subsidies are part of the above-mentioned legislation (Electric Energy Public Service Law).

Overview of the systems and the electricity market

In Mexico there is only one electricity supplier (government owned); it also offers certified electricity from renewable energy sources.

System	Yes/No	Information available
Declaration system	No	
Trading system (redeeming system)	No	
Tracking system/Guarantee of Origin	Yes	www.cfe.gob.mx/es
Responsible body for registration of the tracking information/databases	Federal Electricity Committee (in Spanish: Comisión Federal de Electricidad)	www.cfe.gob.mx/es
Labelling system	No	

Table 23: Overview of the systems in Mexico (Source: PwC)

6.21 Netherlands

National electricity production

The diagram below shows the energy sources for the gross national electricity production in the Netherlands for 2007. The small pie chart on the right shows the share in production of each form of renewable electricity in detail.

National legal framework

The legal framework for regulating the electricity market in the Netherlands consists of various regulations. Among others the most important regulations are:

- Regulation of 08.12.03 on guarantees of origin for renewable electricity
- Act of 05.06.03 amending the Electricity Act 1998 to enhance environmental quality of electricity production
- Act of 20.11.03 amending the Electricity Act 1998 on encouraging the production of renewable electricity
- Decree of 07.06.03 fixing the date of entry into force of the Act of 05.06.03 amending the Electricity Act 1998 to enhance environmental quality of electricity production

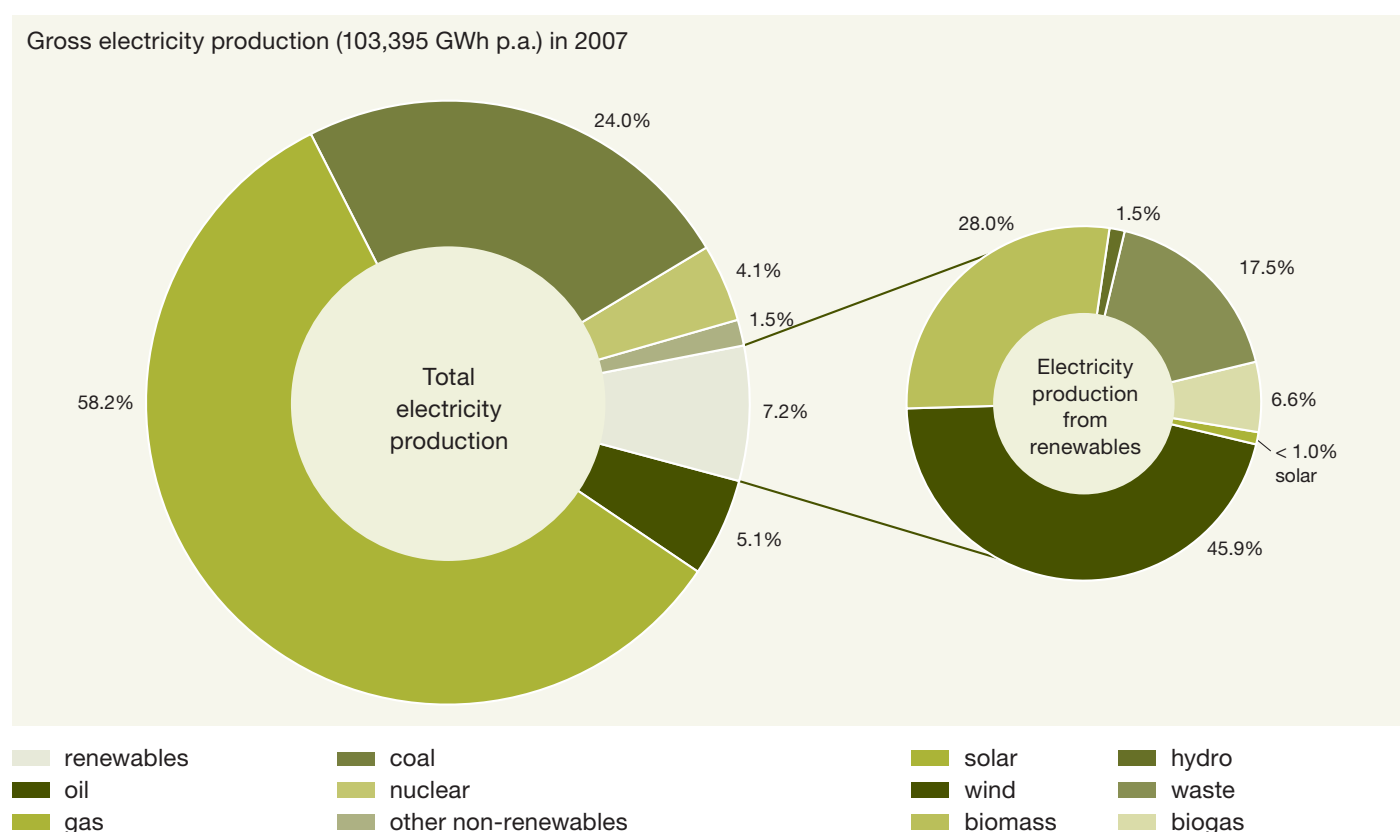


Figure 25: Gross electricity production in the Netherlands in 2007 (Data source: IEA Online Dataservices, OECD Electricity and Heat Generation – Renewables © OECD/IEA, 2008)

- Decree of 03.12.03 fixing the date of entry into force of the Act of 20.11.03 amending the Electricity Act 1998 on encouraging the production of renewable electricity
- Decree of 08.12.03 on the designation of the guarantee management body.

The Dutch government introduced a system that installed incentives for domestic RES-E (electricity from renewable energy sources) production in 2003. Although successful in encouraging investments, this system (based on premium tariffs), was abandoned in August 2006 due to budgetary constraints.

Only biofuels (solar, wind and biomass) have traditionally been supported by means of R&D funds. To this date, technological innovations in this field are encouraged by means of financial support. In 2006, a tax relief system was introduced. The mechanism that was chosen links the quantity of biofuels to the national targets, by requiring fuel suppliers to ensure a 2%

share of biofuel from 2007 onwards, and a 5.75% share from 2010 onwards. Limited investment subsidies are available for RES heating and cooling activities. Feed-in tariffs (see above) are also applied to CHP. These subsidies are part of the above-mentioned legislation.

Overview of the systems and the electricity market

In the Netherlands, two electricity suppliers offer certified electricity from renewable energy sources. They are focused on the national market and are responsible for the selling and distributing the certified electricity. Certified electricity products can be ordered via product brochures, phone or online.

System	Yes/No	Information available
Declaration system	No	
Trading system (redeeming system)	RECS, organisation trading in green certificates	www.recs.org/recs/themembers.asp?country=netherlands
Tracking system/Guarantee of Origin	No	
Responsible body for registration of the tracking information/databases		
Labelling system	Milieukeur Groene Elektriciteit	See relevant page in this survey

Table 24: Overview of the systems in the Netherlands (Source: PwC)

6.22 New Zealand

National electricity production

The diagram below shows the energy sources for the gross national electricity production in New Zealand for 2007. The small pie chart on the right shows the share in production of each form of renewable electricity in detail.

National legal framework

The legal framework for regulating the electricity market in New Zealand consists of three regulations; all are national in scope.

First, the Electricity Act 1992 established the Electricity Commission to oversee New Zealand's electricity market and industry. The Commission regulates the operation of the electricity industry and markets to ensure electricity is produced and delivered to all consumers in an efficient, fair, reliable and environmentally sustainable manner. The Commission also promotes and facilitates the efficient use of electricity. Second, the Commerce Act Part 4a regulates thresholds on price and quality of electricity distribution businesses to protect

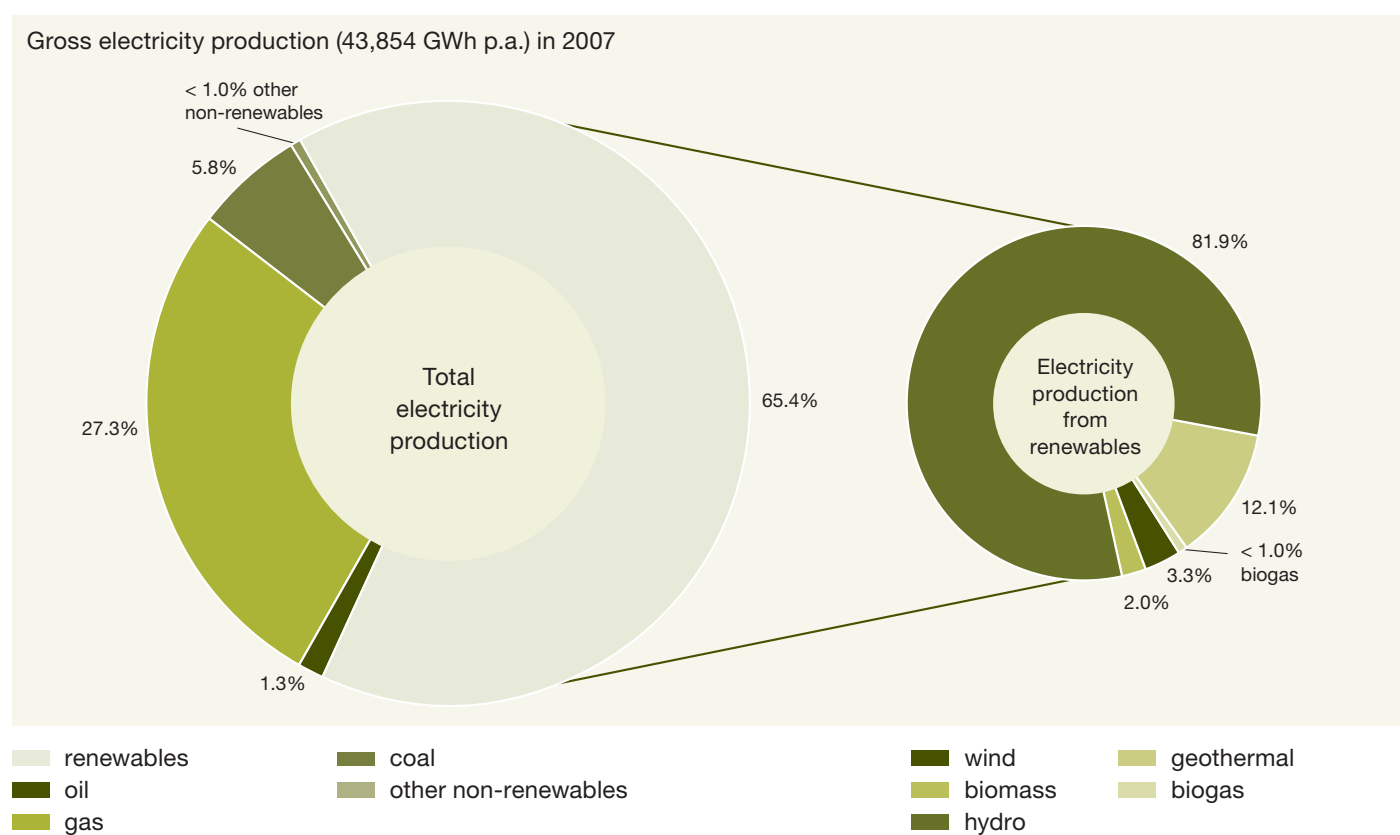


Figure 26: Gross electricity production in New Zealand in 2007 (Data source: IEA Online Dataservices, OECD Electricity and Heat Generation – Renewables © OECD/IEA, 2008)

end consumers through the Commerce Commission. Third, the purpose of the Electricity Industry Reform Act 1998 is to separate out electricity distribution services from generation and retail. In New Zealand, an electricity distribution business cannot retail or generate electricity.

The government does not financially support the production of electricity from renewable energy sources.

Overview of the systems and the electricity market

One out of five electricity suppliers offers electricity from renewable energy sources.

System	Yes/No	Information available
Declaration system	No	
Trading system (redeeming system)	No	
Tracking system/Guarantee of Origin	No	
Responsible body for registration of the tracking information/databases		
Labelling system	No	

Table 25: Overview of the systems in New Zealand (Source: PwC)

6.23 Philippines

National electricity production

The diagram below shows the energy sources for the gross national electricity production in the Philippines for 2007. The small pie chart on the right shows the share in production of each form of renewable electricity in detail.

National legal framework

The legal framework of the Philippines for regulating the electricity market consists of two regulations; both are national in scope.

First, the RA 9136 Electricity Power Industry Reform Act of 2001: Its objectives are power assets privatisation, establishment of a wholesale electricity spot market, retail competition and open access, unbundling of rates, removal of inter- and intra-grid cross-subsidies, and the provision of life-line rates for marginalised sector end-users. Second, the RA 9337 Expanded Value-Added Tax (E-VAT) Law: its scope is value-added tax exemption for electricity generated through renewable energy.

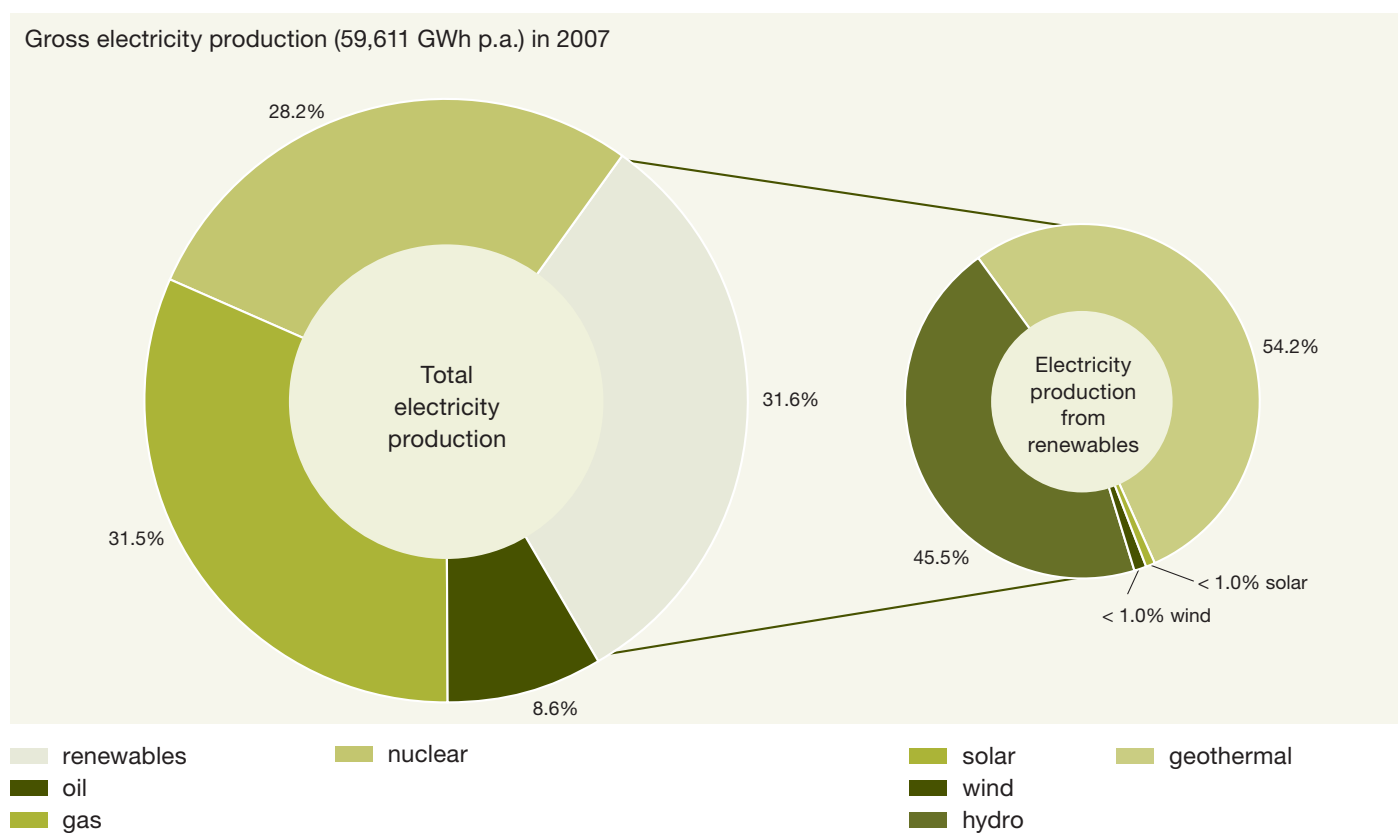


Figure 27: Gross electricity production in the Philippines in 2007 (Data source: Policy Formation and Research Division of the Department of Energy, Power Sector Situationer, 2007)

The government financially supports the production of electricity from renewable energy sources: In October 2008, the Senate ratified the Renewable Energy Act of 2008. This law provides incentives for developers of alternative energy including several tax shelters, such as a seven year income tax holiday for renewable energy developers or the use of high-technology and an ensuing 10% corporate income tax once the income tax holiday expires (as opposed to the standard 30% rate). Furthermore there are tax exemptions for carbon credits generated from renewable energy projects and a 1.5% realty tax cap on the original cost of equipment for renewable energy infrastructure. Other incentives are exemption from

import duties for 10 years on importation of equipment and material used for renewable energy purposes, cash incentives for renewable energy developers for missionary electrification or other tax recognition incentives such as net-operating loss carry-over or accelerated depreciation. The E-VAT law exempts the sale of power or fuel generated through renewable sources of energy from any tax levy. These subsidies are part of the legislation mentioned above (E-VAT).

These fiscal incentives will begin to take effect as soon as the President of the Philippines signs the Act into law.

Overview of the systems and the electricity market

System	Yes/No	Information available
Declaration system	No, though once the Renewable Energy Act of 2008 is signed into law, a provision exists for consumers to eventually be able to choose renewable energy as an option	Section 9 in the Renewable Energy Act of 2008 is on the Green Energy Option programme which provides end-users the option to choose Renewable Energy sources. The distribution utilities are mandated to provide the mechanisms for the physical connection and commercial arrangements necessary to ensure the success of the Green Energy Option.
Trading system (redeeming system)	No, though once the Renewable Energy Act of 2008 is signed into law, a trading system will exist but in the sense of integration into a wholesale electricity spot market.	Section 8 in the Renewable Energy Act of 2008 is for the establishment of the Renewable Energy Market (REM), and thus the rules in the current Wholesale Electricity Spot Market (WESM) will be changed in order to incorporate rules for the operation of the REM under the WESM.
Tracking system/Guarantee of Origin	No, though once the Renewable Energy Act of 2008 is signed into law, a provision exists for the establishment of a Renewable Energy Registrar that shall issue, keep and verify Renewable Energy trading certificates corresponding to energy generated from eligible Renewable Energy facilities.	Section 6 in the Renewable Energy Act of 2008 is the future imposition of a Renewable Portfolio Standard to newly installed electricity capacity, which means that electricity suppliers will have to source some of their electricity from eligible renewable energy sources.
Responsible body for registration of the tracking information/databases	Not until the Renewal Energy Act of 2008 is signed into law.	Renewable Energy Registrar – to be established by the Philippine Electricity Market Corporation (PEMC) .
Labelling system	No	

Table 26: Overview of the systems in the Philippines (source: PwC)

6.24 Poland

National electricity production

The diagram below shows the energy sources for the gross national electricity production in Poland for 2007. The small pie chart on the right shows the share in production of each form of renewable electricity in detail.

National legal framework

The Polish Energy Law Act (in Polish: Prawo Energetyczne wraz z rozporzdzzeniami) is the legal framework regulating the electricity market in Poland; it is national in scope.

Its aims are the security of supply, transnational trading, cost-covering feed-in tariffs for electricity and the facilitation of renewable energy.

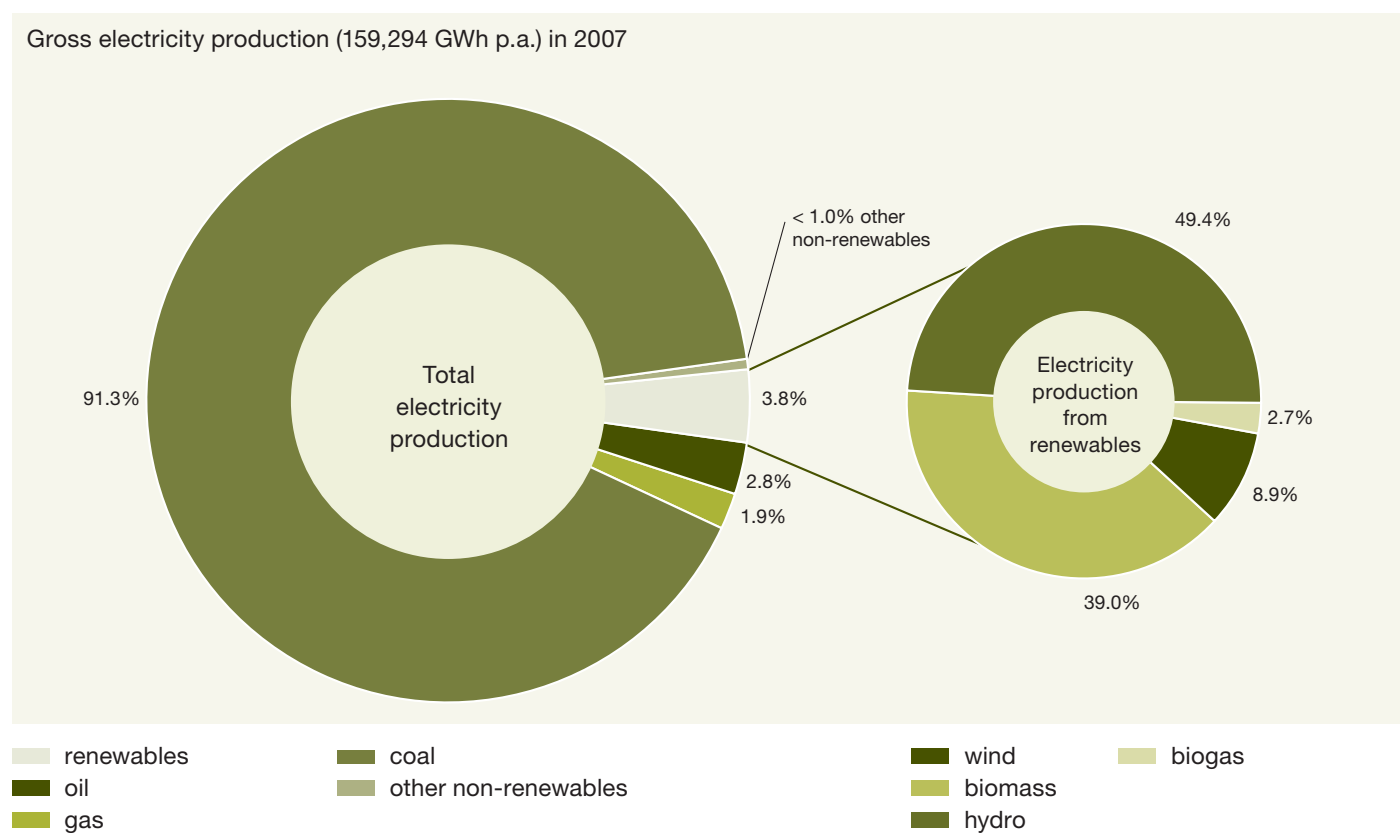


Figure 28: Gross electricity production in Poland in 2007 (Data source: IEA Online Dataservices, OECD Electricity and Heat Generation – Renewables © OECD/IEA, 2008)

Generation of electricity from renewable energy sources is supported by the government. Although the government does not directly support the production of electricity from renewable energy sources financially, the mechanisms in place encourage the inclusion of renewable energy in electricity sold to end consumers via the RECS scheme. Local suppliers are obliged to buy all renewable electricity produced in the market. Energy suppliers have to ensure that 7% of all electricity sold to end-users is covered by a RECS scheme (this represents the 2008 requirement).

Overview of the systems and the electricity market

The current electricity market is based on bilateral contracts. Only a few percent is transferred through the power exchange. The role of the system administrator is fulfilled by the Transmission System Operator (PSE Operator S.A.) who also has the responsibility of registration and administration of transactions on the market. The third party access rule was introduced for all end-users; however, large industrial consumers are the most active group of customers. Households and smaller commercial customers are reluctant to change their suppliers.

System	Yes/No	Information available
Declaration system	Yes	
Trading system (redeeming system)	System Świadectw Pochodzenia (RECS); Polish Power Exchange (Towarowa Giełda Energii (TGE))	www.recs.org/rececs/themembers.asp?country=poland www.polpx.pl Urząd Regulacji Energetyki (URE) (energy regulatory body)
Tracking system/Guarantee of Origin	Yes	Applicable for electricity generated from renewable energy sources
Responsible body for registration of the tracking information/databases	Energy Regulatory Office (Urząd Regulacji Energetyki (URE)) in Warsaw	www.ure.gov.pl
Labelling system	No	

Table 27: Overview of the systems in Poland (Source: PwC)

6.25 Portugal

National electricity production

The diagram below shows the energy sources for the gross national electricity production in Portugal for 2007. The small pie chart on the right shows the share in production of each form of renewable electricity in detail.

National legal framework

The legal framework for regulating the Portuguese electricity market consists of 3 legal regulations; all are national in scope.

First, Decree-Law No. 29/2006 (in Portuguese: Decreto-Lei n.º 29/2006) establishes common rules for the national electricity system in terms of generation, transmission, distribution, supply and operation of the electricity market. Second, Decree-Law No. 172/2006 (in Portuguese: Decreto-Lei n.º 172/2006) regulates the general principles and functions of the national electricity system. Third, Decree-Law No. 168/99 (changed by Decree-Law No. 339-C/2001, Decree-Law No. 33-A/2005, Rectification Declaration No. 29/2005 and Decree-Law No. 225/2007) (in Portuguese: Decreto-Lei n.º 168/99) defines

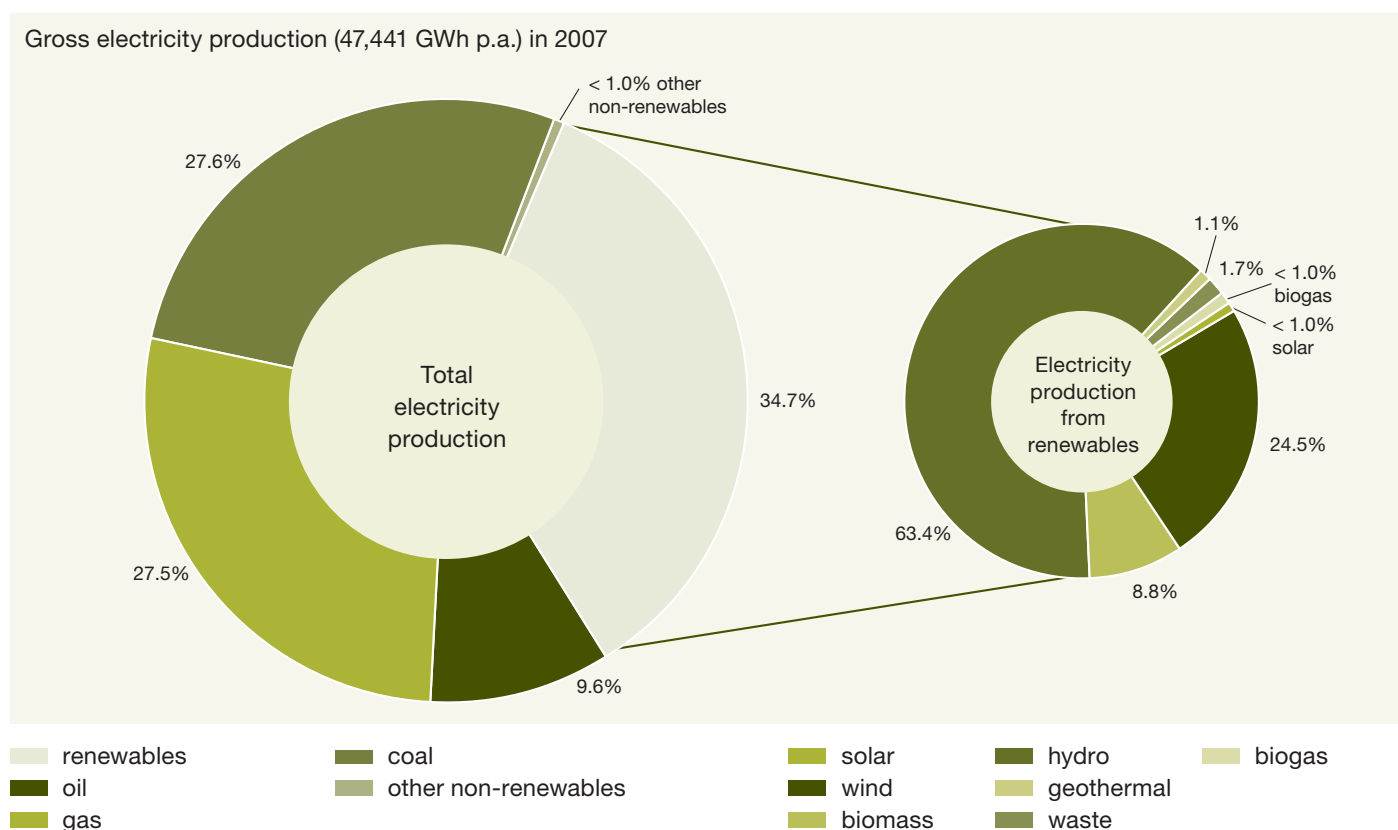


Figure 29: Gross electricity production in Portugal in 2007 (Data source: IEA Online Dataservices, OECD Electricity and Heat Generation – Renewables © OECD/IEA, 2008)

formulas for the calculation of the value of remuneration for providing the energy to the Portuguese electricity system (in Portuguese: Sistema Eléctrico Nacional), describes procedures for the allocation of power available and the deadlines for obtaining a permit for the establishment of renewable energy plants.

The government supports the production of electricity from renewable energy sources financially. Subjects of these subsidies are: solar, wind, biomass and hydroelectric energy. In Portugal, there are specific prices for the supply of renewable energy to the Portuguese electricity system. There are fixed prices according to the production technology, expressed in €/MWh of energy. Additionally, there is also a financing system specifically for renewable energy projects and tax deduction for the acquisition of equipment using renewable energy. These subsidies are part of the above-mentioned legislation (Decree-Law No. 168/99).

Overview of the systems and the electricity market

In Portugal, one out of five electricity suppliers offers electricity from renewable energy sources. The electricity supplier is responsible for selling and distributing the certified electricity. Suppliers are subject to certain service standards with respect to the quality and continuous supply of electricity and are required to provide access to information in simple and understandable terms. There is no declaration system as yet; however, in 2008 a proposal was presented to parliament for the introduction of information on the energy mix and CO₂ emissions associated with the electricity consumption.

System	Yes/No	Information available
Declaration system	No	
Trading system (redeeming system)	RECS	www.recs.org/recs/themembers.asp?country=portugal
Tracking system/Guarantee of Origin	No	
Responsible body for registration of the tracking information/databases		
Labelling system	No	

Table 28: Overview of the systems in Portugal (Source: PwC)

6.26 Singapore

National electricity production

The diagram below shows the energy sources for the gross national electricity production in Singapore for 2007. The small pie chart on the right shows the share in production of each form of renewable electricity in detail.

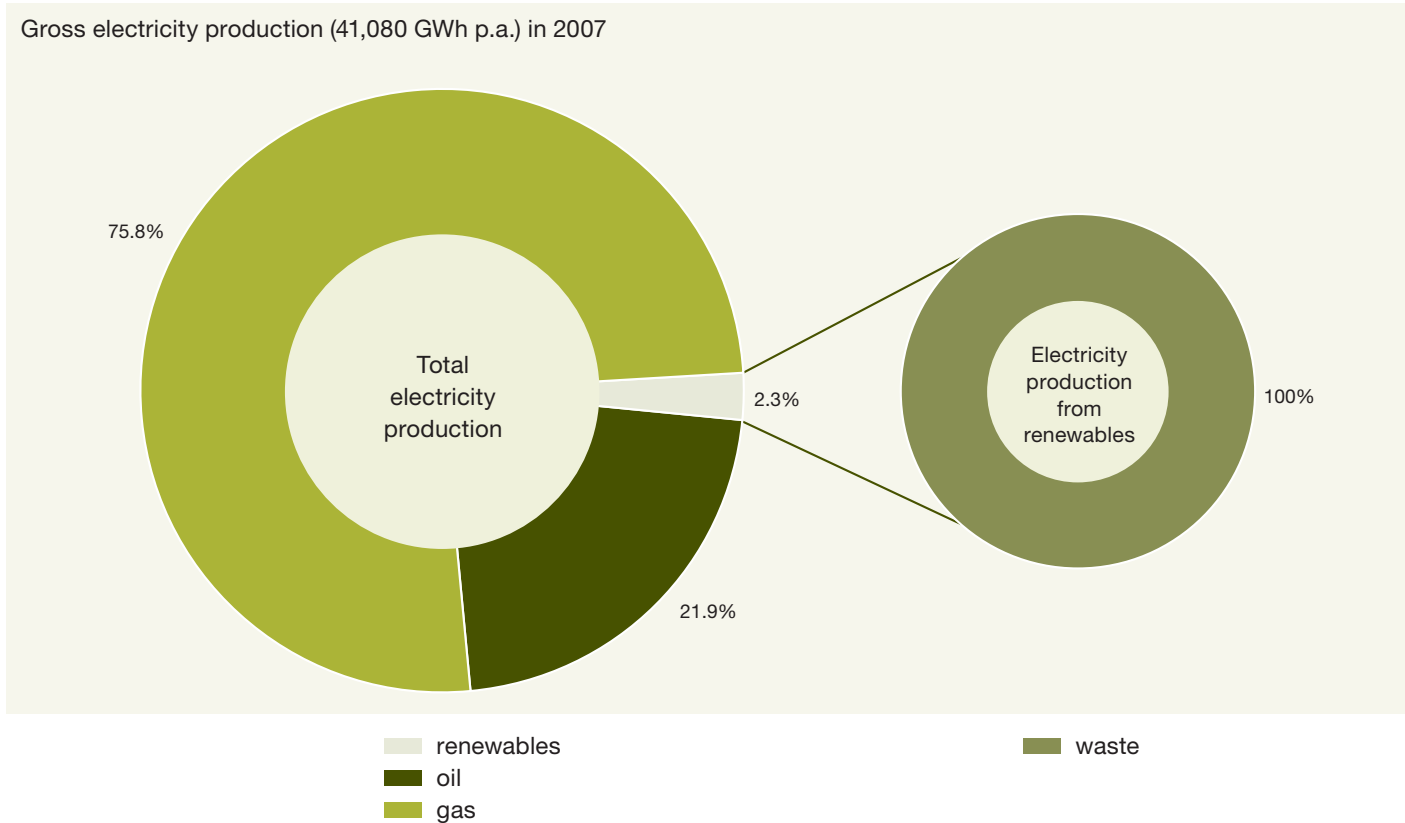


Figure 30: Gross electricity production in Singapore in 2007 (Data source: Ministry of Trade and Industry of the Republic of Singapore, National Energy Policy Report, 2007)

National legal framework

The legal framework for regulating the electricity market in Singapore is the National Energy Policy.

The objective of the policy is to maintain a balance between the policy objectives of economic competitiveness, energy security and environmental sustainability. Additionally, the Electricity Act 2001 aims to provide a competitive market framework for the electricity industry, and for the safety, technical and economic regulation of generation, transmission, supply and use of electricity, and to repeal the Electrical Workers and Contractors Licensing Act. It is national in scope.

The government supports the production of electricity from renewable energy sources. Subjects of the subsidies are solar and biomass. There are three main objectives on the agenda. First, facilitating research and development (R&D). A*STAR has established an Energy Technology R&D Programme, and is setting up the Singapore Initiative on New Energy Tech-

nologies (SINERGY) Centre to develop alternative energy technologies and intelligent grid management systems for distributed generation. The National Research Foundation has set aside \$170 million for R&D in clean energy. In a bid to boost Singapore's clean energy industry, the Sustainable Energy Association of Singapore – supported by SPRING Singapore and IE Singapore – will embark on a \$1.8 million programme to enhance the capabilities of the sustainable energy industry in Singapore beginning 2009. To boost technology adoption among environmental SMEs, SPRING launched the EnviroTech Capability Development Programme (CDP) and Environmental and Water Technology Centre of Innovation (EWT COI). The EnviroTech CDP provides funding support for SMEs and catalyses industry collaboration. The EWT COI, set up by Ngee Ann Polytechnic and supported by SPRING, helps SMEs tap technology to develop marketable solutions. The COI has taken on 35 projects, with another 20 in the works. Second it serves test-bedding and demonstration. The Energy Market Authority (EMA) is setting up a \$5 million Market Development Fund which will help to pay market charges for the test-bedding of new power generation technologies.

The Economic Development Board has launched a \$17 million Clean Energy Research and Test-bedding Programme to test-bed solar, photovoltaic and other new technologies. Finally, reducing costs and facilitating grid connection through exemption from market charges for micro generation with capacity of less than 1 MW for self-consumption. In June 2007, EMA removed the registration fee for market participation that was imposed on facilities selling electricity into the grid. EMA is further reviewing the reduction of the Wholesaler Licence fee. These subsidies are part of the legislation mentioned (National Energy Policy).

Overview of the systems and the electricity market

In Singapore, none of the 6 electricity suppliers offer certified electricity from renewable energy sources.

System	Yes/No	Information available
Declaration system	No	
Trading system (redeeming system)	No	
Tracking system/Guarantee of Origin	No	
Responsible body for registration of the tracking information/databases		
Labelling system	No	

Table 29: Overview of the systems in Singapore (Source: PwC)

6.27 South Africa

National electricity production

The diagram below shows the energy sources for the gross national electricity production in South Africa for 2007. The small pie chart on the right shows the share in production of each form of renewable electricity in detail.

National legal framework

The Department of Minerals and Energy (DME) is responsible for the legal framework for regulating the electricity market in South Africa. It sets policies, undertakes planning and administers the energy sector in South Africa. Electricity generation and peripheral matters are regulated by National Energy Regulator of South Africa under the Government Electricity Regulation Act (No 4 of 2006 – Regulation for Licensing and Registration of Electricity).

In the case of renewable energy, the DME established a task team in 2005 to develop the certification and regulatory framework for Tradable Renewable Energy Certificates (TREC)s providing proof of origin and differential tariff opportunities for renewable energy systems.

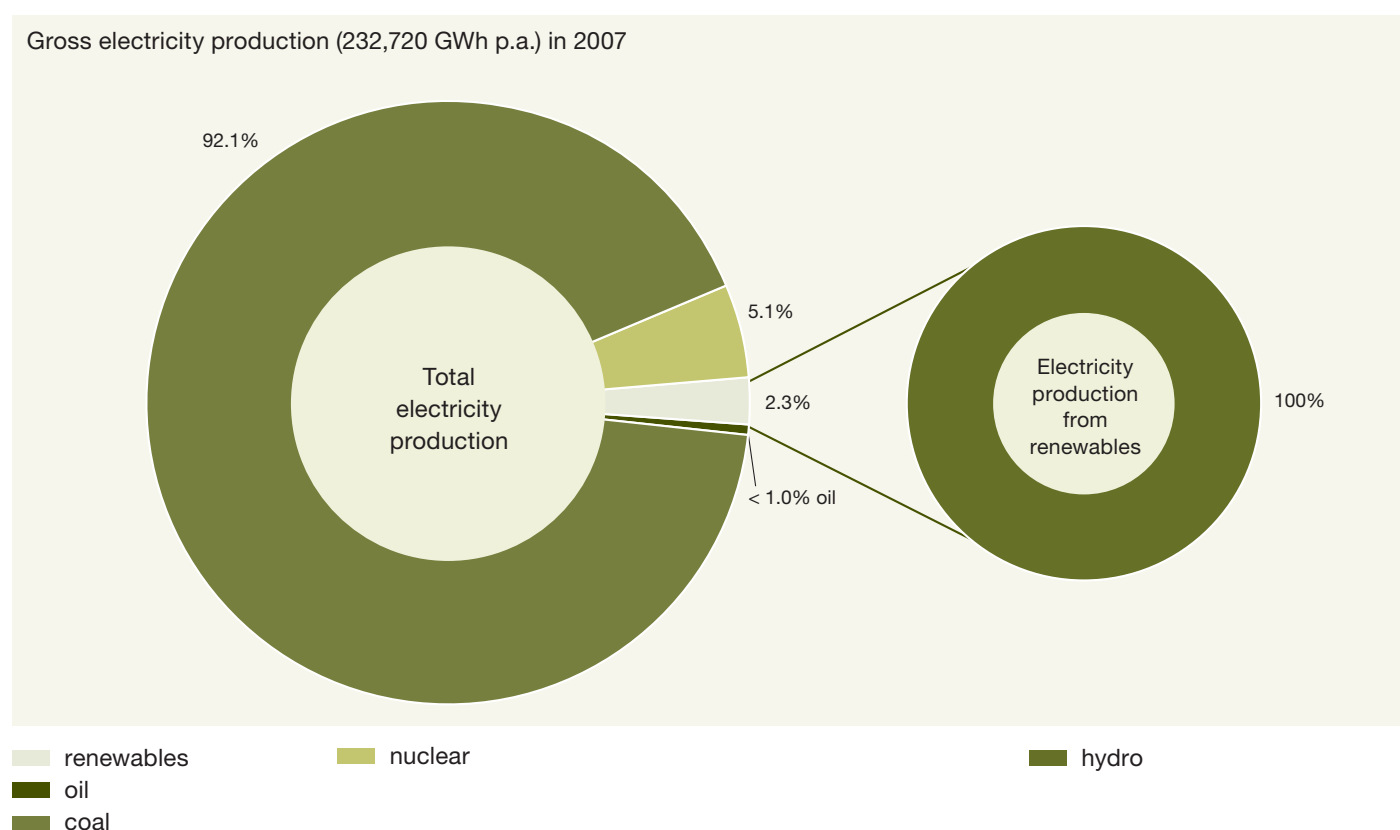


Figure 31: Gross electricity production in South Africa in 2007 (Data sources: The Department of Minerals and Energy, South Africa's Mineral Industry, 2006/2007; National Electricity Regulator (NER); Energy Research Centre, Electricity from Solar Home Systems in South Africa, 2007; SAPP, SAPP Annual Report, 2007; Eskom, Eskom Annual Financial Report 2007)

The various government agencies support the move to generation of electricity from renewable energy sources and give financial support in various ways for the development process through the Central Energy Fund. This fund is a state owned entity which is involved in the search for appropriate energy solutions to meet the future energy needs of South Africa and which is increasingly establishing a stake in the electricity sector by means of equity investments in renewable energy projects.

Overview of the systems and the electricity market

There is one national electricity utility in South Africa and the only electricity supplier offering certified electricity from renewable energy sources. It is a state-owned enterprise which has the legal status of a public company with the South African Government as the sole shareholder. It reports to the Minister of Public Enterprises and is regulated under licences granted by the National Electricity Regulator of South Africa originally under the Electricity Act. Eskom has been designated as the single buyer of electricity generated in South Africa.

System	Yes/No	Information available
Declaration system	No	www.recs.org/recs/themembers.asp?country=south+africa
Trading system (redeeming system)	RECS	The origin of electricity produced in South Africa is declared in Eskom's financial statement; this is a legal requirement
Tracking system/Guarantee of Origin	Yes	www.eskom.co.za
Responsible body for registration of the tracking information/databases	Eskom (state owned electricity supplier)	www.eskom.co.za
Labelling system	No	

Table 30: Overview of the systems in South Africa (Source: PwC)

6.28 Spain

National electricity production

The diagram below shows the energy sources for the gross national electricity production in Spain for 2007. The small pie chart on the right shows the share in production of each form of renewable electricity in detail.

National legal framework

Spain's legal framework for regulating the electricity market consists of three regulations; all are national in scope.

First, the Electricity Law (in Spanish: Ley 54/1997 del Sector Eléctrico) aims at organising the Spanish electricity sector to bring it in line with European Directive 96/92/CE regarding common procedures for the European electricity market. It is considered to be the Spanish legal framework for electricity, subsequently developed by Royal Decrees. Second, the Modified Electricity Law (in Spanish: Ley 17/2007 por la que se modifica la Ley del Sector Eléctrico) regulates the adaptation of the Spanish electricity grid to bring it in line with European Directive 2003/54/CE, especially the common procedures for the European electricity market. Third, the Legislation for Electricity Production with Renewable Energy Sources – Royal

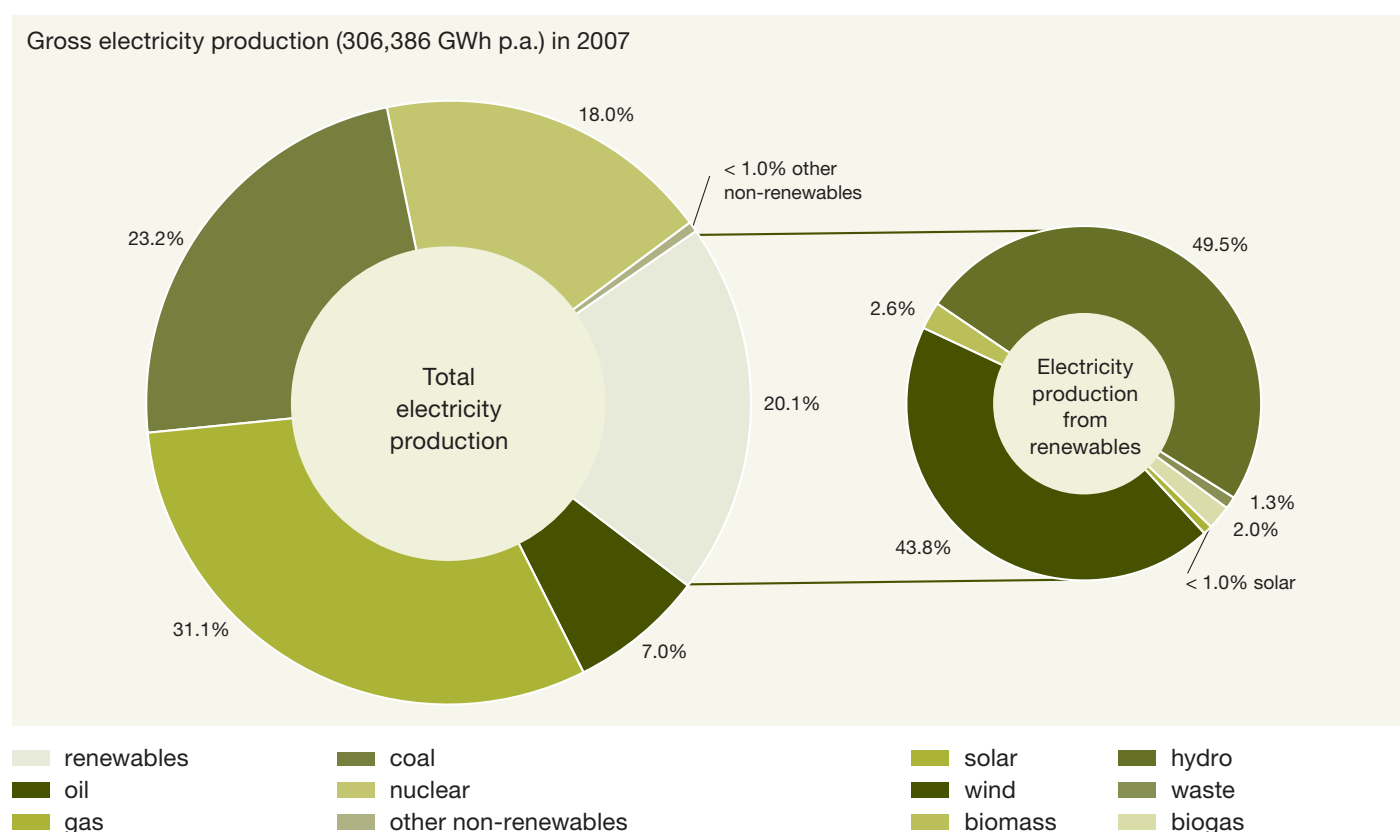


Figure 32: Gross electricity production in Spain in 2007 (Data source: IEA Online Dataservices, OECD Electricity and Heat Generation – Renewables © OECD/IEA, 2008)

Decree 661/2007 (in Spanish: Regula la actividad de producción de energía eléctrica en régimen especial) governs the electricity production with renewable energy sources based on a feed-in tariff system.

The government supports the production of electricity from renewable energy sources financially through subsidies that are part of the Royal Decree 661/2007. Subjects of the subsidies are: solar, wind, biomass, geothermal energy and hydroelectric energy. The system is based on a feed-in tariff system. The Royal Decree 661/2007 defines a specific retribution scheme for each “special regime” technology. Those “special regime” technologies are considered such if the electricity is generated from a plant with an installed capacity of less than 50 MW. Electricity can either be sold as a regulated fee, which is a single sale price for all planning periods, or as a market price that is freely agreed plus a bonus.

Overview of the systems and the electricity market

Nearly all electricity suppliers – seven out of eight suppliers – offer electricity from renewable energy sources nationally. The suppliers themselves are responsible for selling and distributing the certified electricity. Certified electricity products can be ordered online.

System	Yes/No	Information available
Declaration system	Yes	
Trading system (redeeming system)	RECS	www.recs.org/recs/themembers.asp?country=spain
Tracking system/Guarantee of Origin	Yes	Applicable for electricity generated from renewable energy sources
Responsible body for registration of the tracking information/databases	CNE, Spanish National Energy Regulator	www.cne.es
Labelling system	No	

Table 31: Overview of the systems in Spain (Source: PwC)

6.29 Sweden

National electricity production

The diagram below shows the energy sources for the gross national electricity production in Sweden for 2007. The small pie chart on the right shows the share in production of each form of renewable electricity in detail.

National legal framework

The legal framework for regulating the electricity market in Sweden consists of two regulations; both are national in scope.

First, the Law (1994:618) about trading electricity (in Swedish: Lag (1994:618) om handel med el, m.m.) and second, the Electricity Act (1997:857) (in Swedish: Ellag [1997:857]) which establishes the provisions regarding power generation plants and aims at regulating the connection of plants generating renewable electricity, the transfer of renewable electricity and the obligation to expand the grid.

The provisions of the Electricity Act are supplemented by provisions contained in the following regulations:

- Electricity regulation (1994:1250)
- Regulation (1994:1806) on the system responsibility for electricity

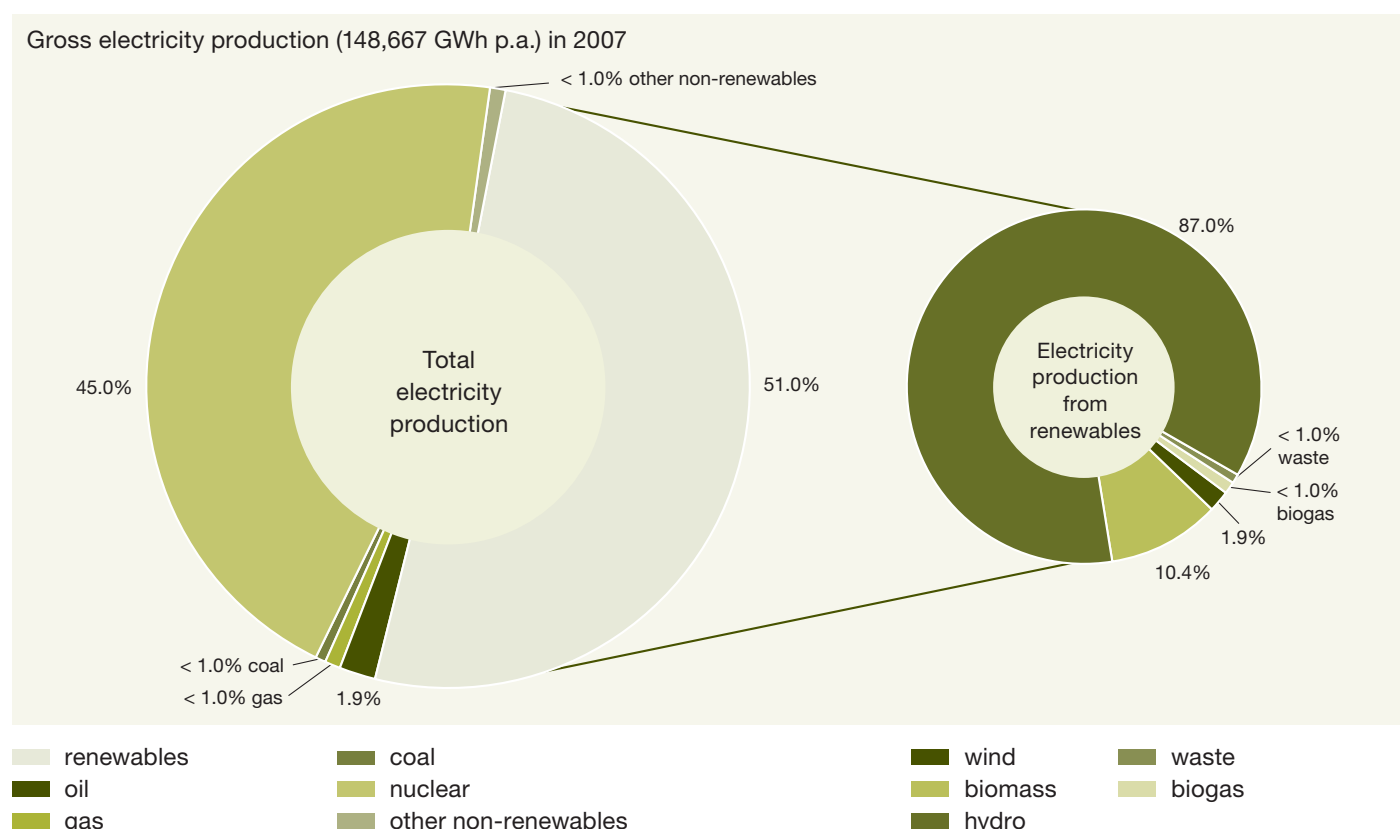


Figure 33: Gross electricity production in Sweden in 2007 (Data source: IEA Online Dataservices, OECD Electricity and Heat Generation – Renewables © OECD/IEA, 2008)

- Regulation (1995:1145) on accounting for the electricity grid
- Regulation (1999:716) on the measurement, calculation and reporting of transmitted electricity.

Further provisions on the recognition and measurement, calculation and reporting have been issued by the Swedish Energy Agency.

Three government agencies have a supervisory role: The Swedish Energy Agency, The Swedish National Electrical Safety Board and the Swedish National Grid Authority (Svenska Kraftnät).

The government does not support the production of electricity from renewable energy sources financially.

Overview of the systems and the electricity market

In Sweden, 50 out of 100 electricity suppliers offer certified electricity from renewable energy sources. The electricity supplier is responsible for selling and distributing the certified electricity. Depending on the electricity supplier, certified electricity products can be ordered from product brochures, by phone or online.

System	Yes/No	Information available
Declaration system	Yes	
Trading system (redeeming system)	RECS	www.recs.org/recs/themembers.asp?country=sweden
Tracking system/Guarantee of Origin	No	
Responsible body for registration of the tracking information/databases	Svenska Kraftnät	www.svk.se
Labelling system	Bra Miljöval	See relevant page in this survey

Table 32: Overview of the systems in Sweden (Source: PwC)

6.30 Switzerland

National electricity production

The diagram below shows the energy sources for the gross national electricity production in Switzerland for 2007. The small pie chart on the right shows the share in production of each form of renewable electricity in detail.

National legal framework

Switzerland's legal framework for regulating the electricity market consists of four regulations; all are national in scope.

First, the Electricity Supply Law (in German: Stromversorgungsgesetz) and second, the Electricity Supply Regulation (in German: Stromversorgungsverordnung) regulate the security of supply and transnational trading. Third, the cost-covering feed-in tariff for electricity from renewable energy sources is fixed in paragraph 7a of the Energy Law (in German: Energiegesetz) and will be administered by the Energy Regulation (ElCom). The Energy Law covers energy efficiency and the use of renewable energy sources. Fourth, the Nuclear Energy Law (in German: Kernenergiegesetz) regulates the peaceful use of nuclear energy and protection of

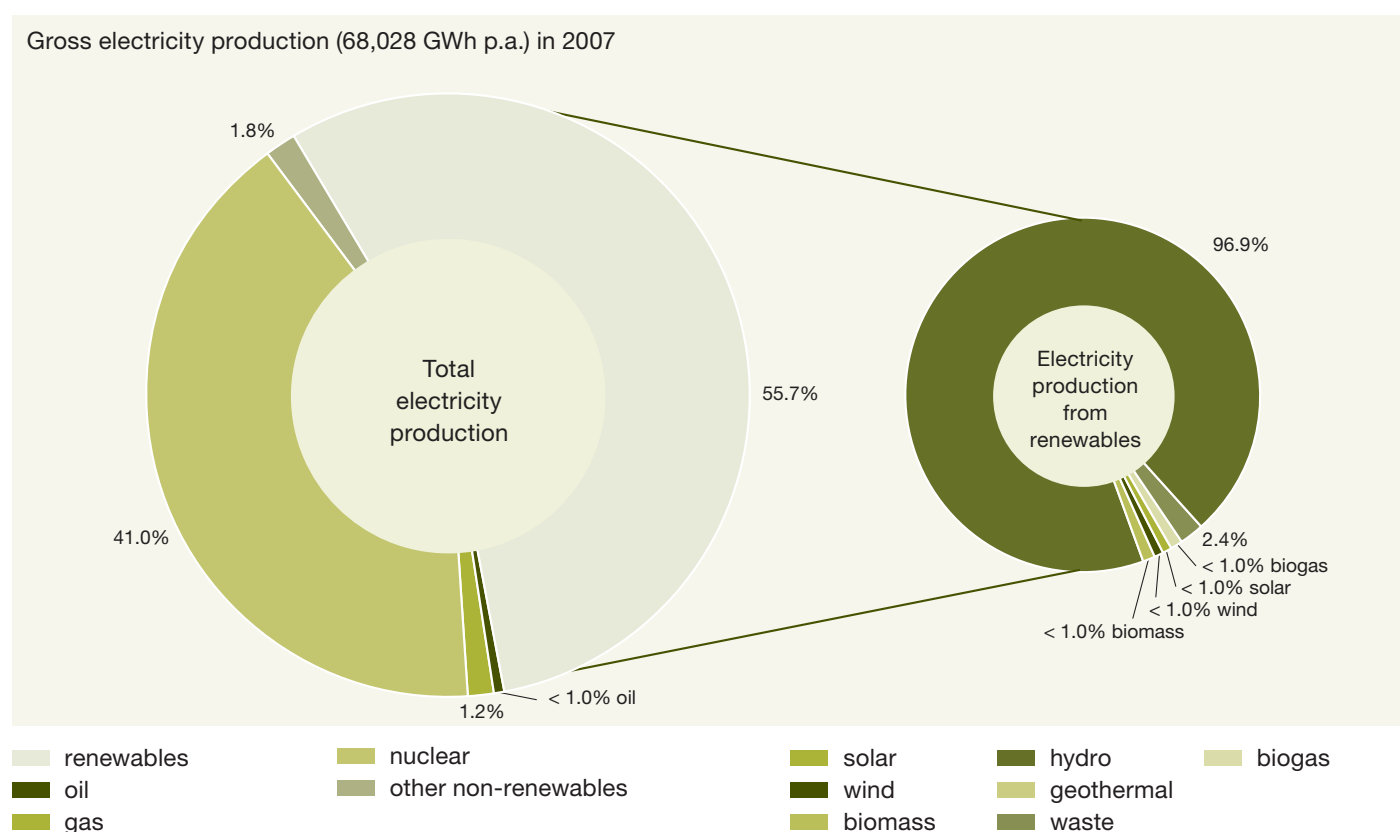


Figure 34: Gross electricity production in Switzerland in 2007 (Data source: IEA Online Dataservices, OECD Electricity and Heat Generation – Renewables © OECD/IEA, 2008)

man and nature. The amendment to the Nuclear Energy Law in 2003 was correlated to the extension of the Energy Law with the implementation of the declaration system. Currently no balance is drawn up between electricity produced versus electricity used.

The government supports the production of electricity from renewable energy sources by means of the cost-covering feed-in tariff. Subsidies are available for solar, wind, biomass, and waste, geothermal and hydroelectric energy. However, only small hydropower plants (max 10 MW) are supported. These subsidies are part of the legislation mentioned above (Energy Law). The law prohibits the sale of the subsidised electricity in the voluntary market.

Overview of the systems and the electricity market

In Switzerland, all major electricity suppliers deliver certified electricity. About 46% of all renewable electricity products sold are certified with naturemade basic or naturemade star labels; roughly the same amount is certified by different TÜV SÜD labels. Depending on the electricity supplier, certified electricity products can be ordered from product brochures, by phone or online. This market has existed for about 10 years and supplies 8% of the entire national electricity consumption. 15% of all electricity consumers (households and business customers) demand certified products from renewable sources.

System	Yes/No	Information available
Declaration system	Stromkennzeichnung	
Trading system (redeeming system)	ECS Switzerland	Applicable for electricity generated from any energy sources
Tracking system/Guarantee of Origin	Guarantee of Origin (Herkunftsnachweis)	
Responsible body for registration of the tracking information/databases	swissgrid AG (Herkunftsnachweis-System)	www.guarantee-of-origin.ch
Labelling system	naturemade and TÜV SÜD labels	See relevant page in this survey

Table 33: Overview of the systems in Switzerland (Source: PwC)

6.31 Turkey

National electricity production

The diagram below shows the energy sources for the gross national electricity production in Turkey for 2007. The small pie chart on the right shows the share in production of each form of renewable electricity in detail.

National legal framework

Turkey's legal framework for regulating the electricity market consists of three regulations; all are national in scope.

First, the Electricity Market Law (in Turkish: Elektrik Piyasası Kanunu), second, the Renewable Energy Law (in Turkish: Yenilenebilir Enerji Kanunu) and third, the Nuclear Energy Law (in Turkish: Nükleer Enerji Kanunu).

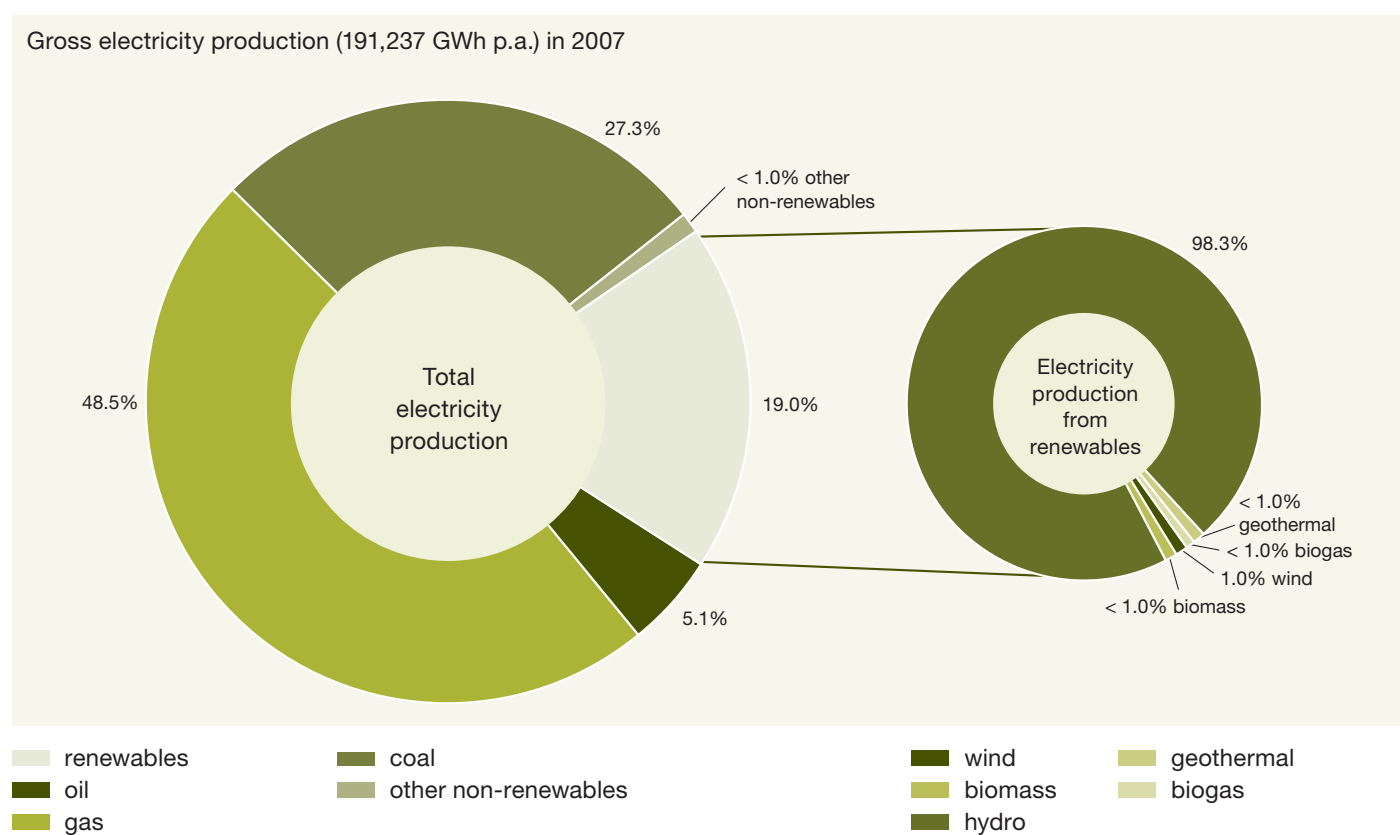


Figure 35: Gross electricity production in Turkey in 2007 (Data source: IEA Online Dataservices, OECD Electricity and Heat Generation – Renewables © OECD/IEA, 2008)

Draft legislation has recently been submitted to Parliament regarding an extension in incentives given to power generation from renewable sources. According to the draft law, the deadline to complete investments in order to be eligible for incentives will be extended to 2016 from the current 2012. For wind power, a floor price of €6 cents per kWh will be applicable for the first five years of operations, decreasing to €5 cents per kWh in the second five-year period. For hydro generation the floor price will be €5 cents per kWh for the entire 10-year period. The new legislation grants different floor price guarantees to different sources, such as €7 cents for geothermal and €18 cents per kWh for solar, which could jump start solar power investments. It will also give discretion to the Council of Ministers to grant incentives for plants that will become operational after 2016.

The government supports the production of electricity from renewable energy sources. Subsidies are available for solar, wind, biomass, geothermal and hydroelectric energy. Turkey has adapted a hybrid system. Renewable power plants built before 2012 are eligible for the €50 – €55 per MWh Renewable Energy Feed-in Tariff (REFIT) for the first 10 years of operation, providing a hedge against foreign exchange risk. Furthermore, retail licence owners are required to allocate a portion of the electricity purchases to renewable power. The proportion of renewable electricity equals the company's previous year market share. These subsidies are part of the legislation mentioned above (Renewable Energy Law).

Overview of the systems and the electricity market

System	Yes/No	Information available
Declaration system	Yes	www.epdk.gov.tr/mevzuat/yonetmelik/elektrikyek.htm (only in Turkish)
Trading system (redeeming system)	RECS	www.recs.org/rececs/themembers.asp?country=turkey
Tracking system/Guarantee of Origin	Yes	www.epdk.gov.tr/mevzuat/yonetmelik/elektrikyek.htm (only in Turkish)
Responsible body for registration of the tracking information/databases	EMRA	www.emra.gov.tr
Labelling system	No	

Table 34: Overview of the systems in Turkey (Source: PwC)

6.32 UK

National electricity production

The diagram below shows the energy sources for the gross national electricity production in the UK for 2007. The small pie chart on the right shows the share in production of each form of renewable electricity in detail.

National legal framework

The legal framework for regulating the electricity market in the UK is the Renewable Obligation Order. Its objective is to provide a tradable renewable certificate to approved renewable generators with a national scope.

The Renewable Obligation Order currently allows approved renewable technologies to receive one Renewable Obligation Certificate (ROC) for each unit of power produced. This can be offset against supplier's obligations to meet an increasing percentage of energy supplied from renewable sources. The ROCs have a floor price but have traded above this given the shortage of renewable capacity.

The government supports the production of electricity from renewable energy sources financially. Subsidies are available for solar, wind, biomass, geothermal energy and hydroelectric energy.

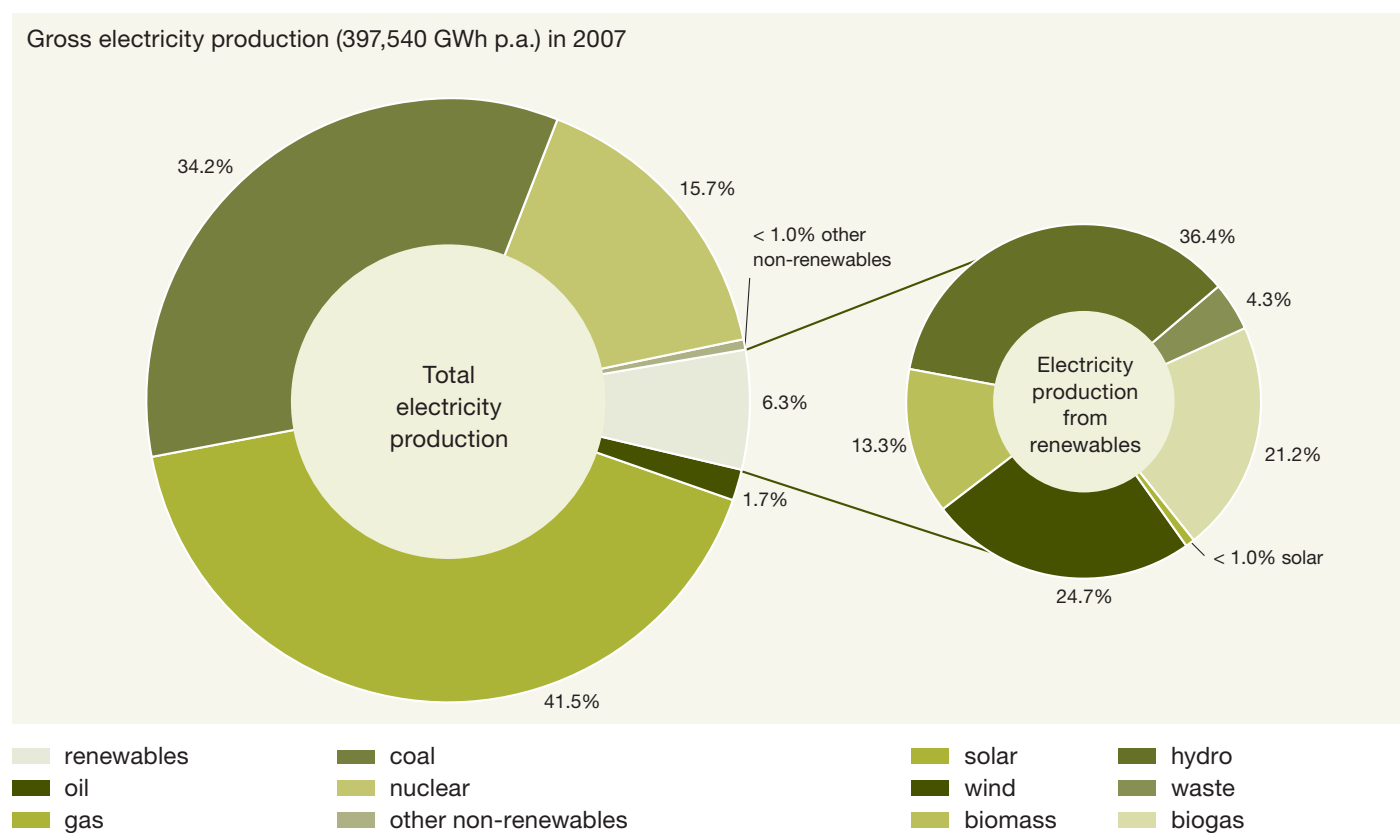


Figure 36: Gross electricity production in the UK in 2007 (Data source: IEA Online Dataservices, OECD Electricity and Heat Generation – Renewables © OECD/IEA, 2008)

Overview of the systems and the electricity market

No suppliers offer certified electricity from renewable sources; however, it is possible for the suppliers to obtain Renewable Energy Guarantees of Origin (REGOs) from the electricity market regulator Ofgem. REGOs are electronic trading certificates attached to electricity produced from renewable sources and were introduced on 27 October 2003 in response to the Renewables Directive – EU Directive 2001/77/EC Article 5. REGOs are issued as evidence that the electricity was generated from a “renewable source” (as defined in the legislation) with one REGO representing one kWh of electricity.

Electricity producers have already a legal obligation to produce a certain amount of their electricity from renewable sources through ROCs. As a consequence, there is almost

no green electricity left for the voluntary market. However, green tariffs are offered on the market with a Levy Exemption Certificate that serve as a subsidy for green electricity and make green electricity more affordable. In June 2008, DEFRA, the department for environment, food and rural affairs, issued a statement that clearly advises consumers to apply the average grid-factor for electricity purchased from green tariffs (instead of using the CO₂-factor for electricity generated from renewable energy sources) in order to avoid a double count against the regulated market. This statement has reinforced consumer action under the lead from British Telecom to generate an electricity label allowing consumers a proper assessment of what they actually purchase. Discussions were still on-going at the time of writing of this report.

Other changes with regard to the reporting regulations are expected due to the Carbon Reduction Commitment that aims at controlling and decreasing the carbon footprint.

System	Yes/No	Information available
Declaration system	Yes	
Trading system (redeeming system)	RECS; Ofgem, the electricity market regulator is proposing a voluntary scheme for independently verified energy ratings for electricity suppliers.	www.recs.org/recs/themembers.asp?country=united+kingdom www.ofgem.gov.uk
Tracking system/Guarantee of Origin	Yes	
Responsible body for registration of the tracking information/databases		
Labelling system	No	

Table 35: Overview of the systems in the UK (Source: PwC)

6.33 Uruguay

National electricity production

The diagram below shows the energy sources for the gross national electricity production in Uruguay for 2007. The small pie chart on the right shows the share in production of each form of renewable electricity in detail.

National legal framework

Uruguay's legal framework for regulating the electricity market consists basically of four legal regulations; all are national in scope.

First, the National Electricity Law (in Spanish: Ley Nacional de Electricidad) established that the state is responsible for electricity policies in Uruguay. Second, the Electricity Sector Regulatory Framework (in Spanish: Ley de Marco Regulatorio del Sector Eléctrico) established that electricity transmission, transformation and distribution directed to third parties would be considered a public service which can only be carried

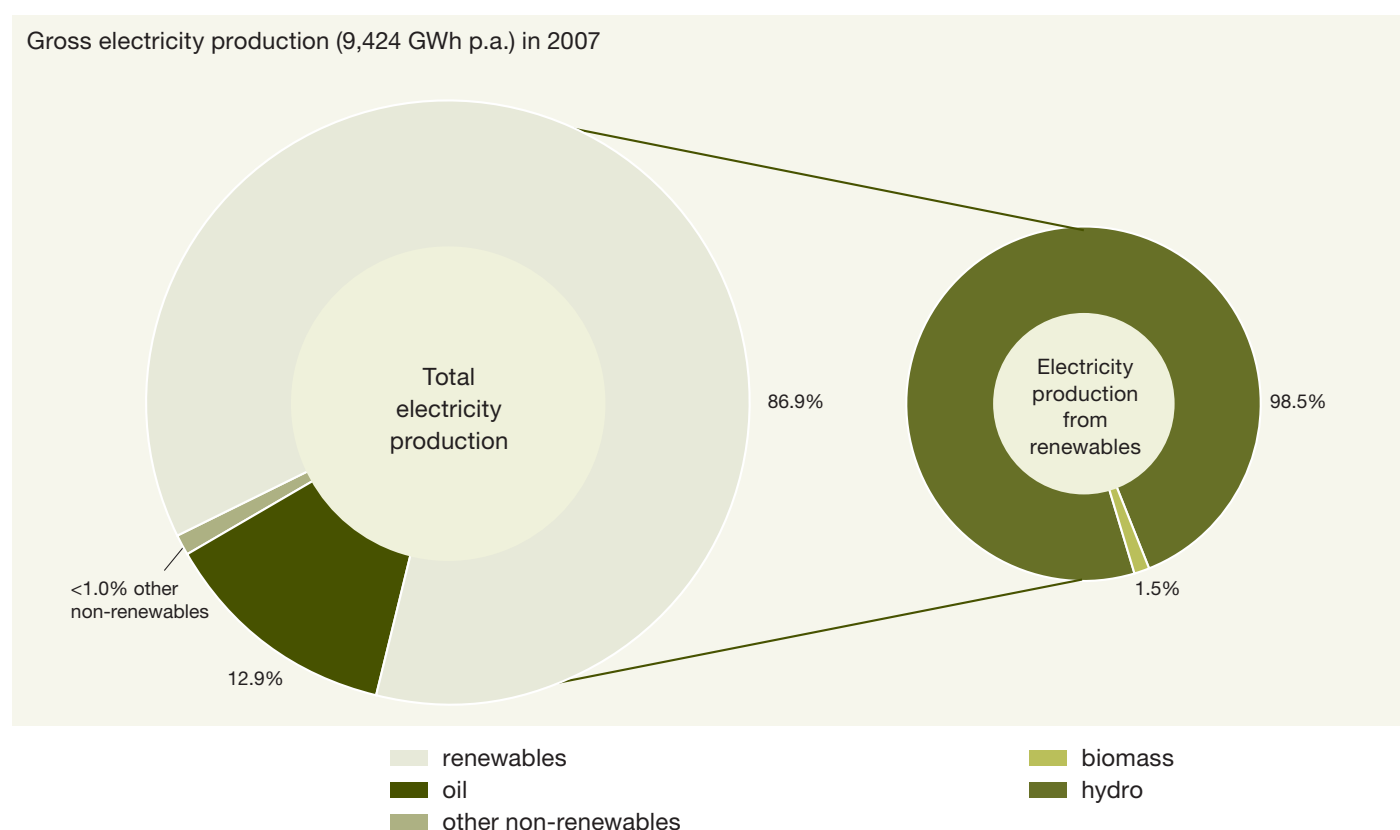


Figure 37: Gross electricity production in Uruguay in 2007 (Data source: www.ute.com.uy, 2008)

out by public companies. Third, the UTE Organic Law (Carta orgánica de UTE [in Spanish: Usinas y Transmisiones Eléctricas]) founded UTE that is responsible for the provision of the public electricity services and the infrastructure necessary to provide these service. Fourth, the Creation of Regulation Unit for the Energy and Water Services (in Spanish: Creación de la Unidad Reguladora de Servicios de Energía y Agua) which supervises all the activities performed regarding energy and water in Uruguay.

The government does not financially support the production of electricity from renewable energy sources.

Overview of the systems and the electricity market

System	Yes/No	Information available
Declaration system	No	
Trading system (redeeming system)	No	
Tracking system/Guarantee of Origin	Yes	Applicable for electricity generated from any energy sources
Responsible body for registration of the tracking information/databases	National Directorate of Energy and Nuclear Technology (Dirección Nacional de Energía y Tecnología Nuclear) in Montevideo	www.miem.gub.uy/portal/hgxpp001?5,6,36,O,S,0,MNU
Labelling system	No	Yes

Table 36: Overview of the systems in Uruguay (Source: PwC)

6.34 USA

National electricity production

The diagram below shows the energy sources for the gross national electricity production in the United States for 2007. The small pie chart on the right shows the share in production of each form of renewable electricity in detail.

National legal framework

The US legal framework consists of various laws and regulations which have different scopes.

First, Regional Greenhouse Gas Initiative (RGGI or “ReGGIe”) is a cooperative effort by nine Northeast and Mid-Atlantic states to discuss the design of a regional cap-and-trade programme initially covering carbon dioxide emissions from power plants in the region. In the future, RGGI may be extended to include other sources of greenhouse gas emissions. The goal is to develop a multi-state cap-and-trade programme covering GHG emissions. This initiative was put in effect in September 2008. Second, the Renewable Energy Portfolio

Standard (RPS) for retail electricity suppliers: An RPS sets a minimum requirement (often a percentage) for electricity production from renewable energy sources or for the purchase of tradable credits that represent an equivalent amount of production. A growing number of states have enacted an RPS, currently including 19 states and the District of Columbia. Third, the Generation Disclosure Rules for Renewable Energy: “Disclosure” typically refers to the requirement that utilities provide their customers with additional information about the energy they are supplying. This information often includes fuel mix percentages and emissions statistics. “Certification” is a related issue which refers to the assessment of green power offerings to assure that they are indeed utilising the type and amount of renewable energy advertised. One example of green power certification is the Green-e stamp. Fourth, the Net Metering Rules: For those consumers who have their own electricity generating units, net metering allows for the flow of electricity both to and from the customer through a single, bi-directional meter. With net metering, during times when the customer’s generation exceeds his or her use, electricity from the customer to the utility offsets electricity consumed at another time. In effect, the customer is using the excess gen-

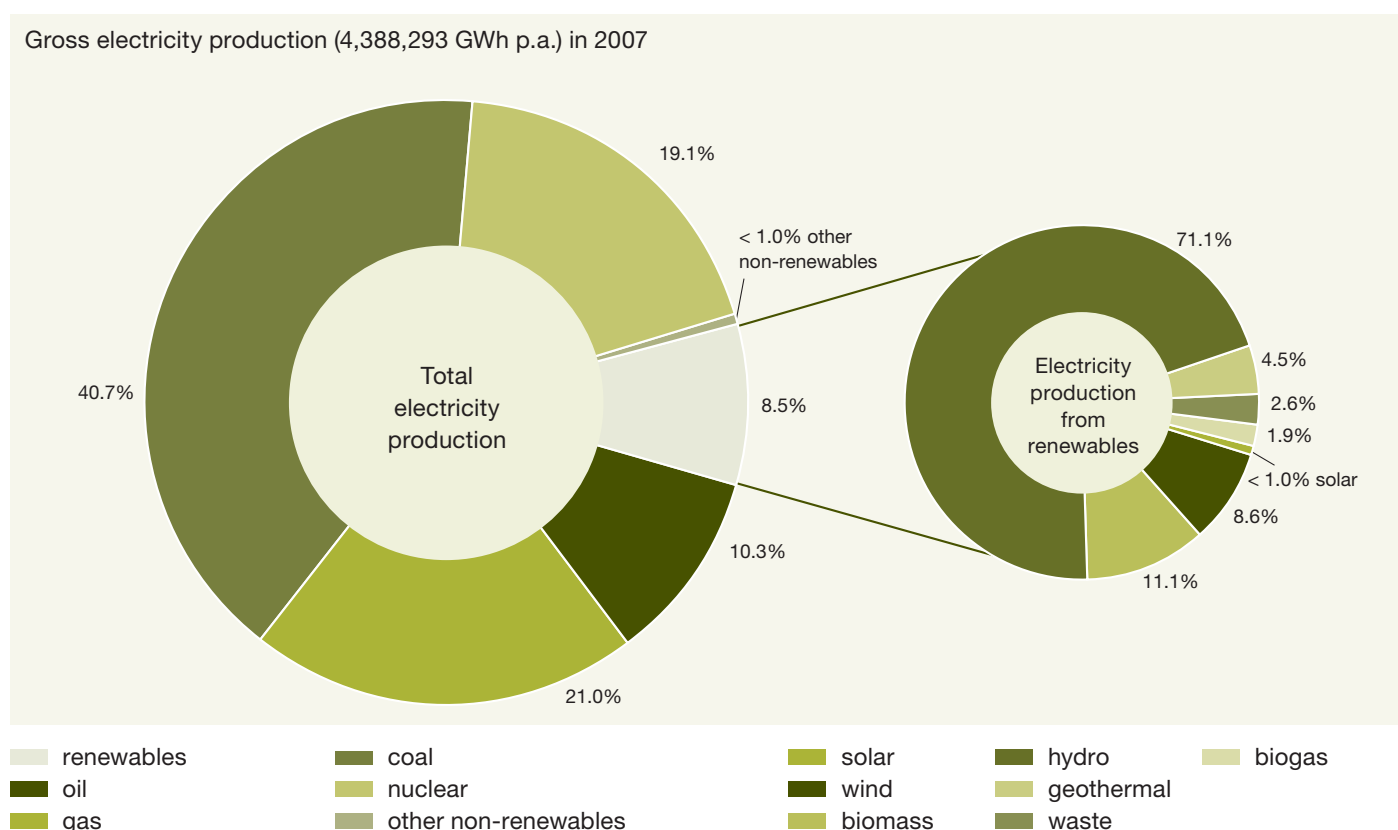


Figure 38: Gross electricity production in the USA in 2007 (Data source: IEA Online Dataservices, OECD Electricity and Heat Generation – Renewables © OECD/IEA, 2008)

eration to offset electricity that would have been purchased at the retail rate. Under most state rules, residential, commercial, and industrial customers are eligible for net metering, but some states restrict eligibility to particular customer classes.

The government supports the production of electricity from renewable energy sources. There are numerous incentives and financial supports for renewable energy generation and consumption, but the government is not necessarily involved with generation or distribution of renewable energy. Subsidies are available for solar, wind, biomass, geothermal energy and hydroelectric energy. The subsidies are not part of the legislation mentioned.

Section 9006 of the Federal Farm Security and Rural Investment Act of 2002 required the U.S. Department of Agriculture (USDA) to create a programme to offer direct loans, loan guarantees, and grants to agricultural producers and rural small businesses to purchase renewable-energy systems and make energy-efficiency improvements. This programme is known as the Renewable Energy Systems and Energy Efficiency Improvements Program. Funding in the amount of \$23 million per year was appropriated for each fiscal year from FY 2003-2007.

The federal Renewable Energy Production Incentive (REPI) provides incentive payments for electricity produced and sold by new qualifying renewable energy facilities. Qualifying systems are eligible for annual incentive payments of 1.5 ¢ per kilowatt-hour for the first 10-year period of their operation,

subject to the availability of annual appropriations in each federal fiscal year of operation.

The Renewable Electricity Production Credit (PTC) is a per kilowatt-hour tax credit for electricity generated by qualified energy sources which was enacted as part of the Energy Policy Act of 1992 .

The federal tax credits are renewed on an annual basis and are prone to expiration. State tax credits are more stable. An example of such an incentive is the Renewable Energy Production Tax Credit (Corporate) in New Mexico. Enacted in 2002, the New Mexico Renewable Energy Production Tax Credit provides a tax credit against the corporate income tax of one cent per kilowatt-hour for companies that generate electricity from wind or biomass. Companies that generate electricity from solar energy receive a tax incentive that varies annually according to the scale that averages 2.7 ¢/kWh annually.

Overview of the systems and the electricity market

In the US, the number of green electricity suppliers varies from state to state. In New York for example, 24 entities provide green electricity, 10 of which are certified. There are 44 green electricity suppliers nationwide, 36 of which provide certified green electricity. Depending on the electricity supplier certified electricity products can be ordered by phone or online.

System	Yes/No	Information available
Declaration system	Yes	
Trading system (redeeming system)	RECS Evolution markets There are numerous other regional tracking systems. REC markets are increasingly overseen through regional tracking systems such as WREGIS, NEPOOL, GATS, ERCOT, M-RETS, and CRS.	www.recs.org/recs/themembers.asp?country=united+states
Tracking system/Guarantee of Origin	Yes	Applicable for electricity generated from any energy source
Responsible body for registration of the tracking information/databases	M-RETS	www.m-rets.com
Labelling system	Power Scorecard Green-e	See relevant page in this survey

Table 37: Overview of the systems in the USA (Source: PwC)

7 Label reports

How to read the label reports

The label graphs were created with the intention of giving a quick overview of the different labels. Even though the graphs provide a rough feeling of the overall quality and focus of a label, the aim is not to rank the labels, rather to help consumers to find the right label to match their preferences. If a potential

consumer finds ecological criteria much more important than procedural criteria, a label that scores high in the ecological criteria should be chosen.

Label graph

The label graph below illustrates the characteristics of the label (example), split into sustainability and process criteria.

Sustainability Criteria – Label: Example

Category	Criteria	None	Low	Medium	High
Ecological criteria	1 Hydroelectricity: minimum flow regulations				
	2 Hydroelectricity: hydro peaking				
	3 Hydroelectricity: reservoir management				
	4 Hydroelectricity: bed load management				
	5 Hydroelectricity: power plant design				
	6 Hydroelectricity: ecological improvement fund				
	7 Hydroelectricity: equal treatment of all sizes of power plants				
	8 Electricity from wind				
	9 Electricity from photovoltaics				
	10 Electricity from biomass				
	11 Electricity from geothermal energy and tidal power plants				
	12 Electricity from waste				
	13 Exclusion of non-renewable electricity				
	14 Quality of renewables support scheme				
Social and economical criteria	15 No rivalry between electricity generation and food cultivation				
	16 Securing soil fertility and land use				
	17 Biomass tracking				
	18 Social criteria for dam building projects				
	19 Corporate social responsibility of electricity producer				
	20 Market share				

Process Criteria – Label: Example

Category	Criteria	None	Low	Medium	High
Organisation and professionalism	1 Representation of industry				
	2 Representation of pressure groups				
	3 Guarantee of legal compliance				
	4 Audit by independent third party				
	5 Periodical revaluation of certification				
Balancing	6 Declaration of origin				
	7 Avoidance of double counting				
	8 Regulation for deficit in supply				
	9 Only net energy permitted				
	10 LCA verification				
Transparency	11 Availability of information on electricity quality				
	12 Communication and availability of criteria				
	13 Protection of consumer rights				

Figure 39: The label graph illustrates an example of a label assessment, split into sustainability and process criteria (Source: PwC)

7.1 GreenPower – Australia

Overview of labelling system

Name of label	GreenPower
Responsible body	■ GreenPower representatives include: Sustainability Policy and Programs, Department of Territory and Municipal Services/Department of Water and Energy, New South Wales/Department of Mines and Energy, Queensland/Department for Transport, Energy and Infrastructure, South Australia/Sustainability Victoria/Sustainable Energy Development Office, Western Australia ■ GreenPower observers include: Australian Greenhouse Office, Commonwealth/Northern Territory Department of Mines and Energy, Northern Territory/Tasmanian Office of Energy, Planning and Conservation, Tasmania
Web page	www.greenpower.gov.au
Certification criteria	www.greenpower.gov.au
Name of auditing company	URS Australia Pty Ltd for the NSW Department of Water and Energy, on behalf of the National GreenPower Steering Group
Energy sources which are eligible for certification and are audited by criteria	Solar, wind, biomass (waste timber, biogenic material, agricultural biogas, sewage gas), geothermal energy, hydroelectric energy (run-of-the-river power plant, wave and tidal power plant), waste incineration, landfill gas
Support scheme	GreenPower's accreditation standards include: ■ not allowing the use of native forest wood waste in biomass generators; ■ not allowing hydro generation that involves the redirection of environmental water flows in rivers ■ only allowing generation from facilities built since 1997. This is due to the need to create "new" renewable energy facilities. Other renewable energy exists, but it was built before 1997, and was already contributing energy to the electricity grid.
Remarks	None

Table 38: Overview of GreenPower (Source: PwC)

Label graph

Sustainability Criteria – Label: GreenPower (AU)

Category	Criteria	None	Low	Medium	High
Ecological criteria	1 Hydroelectricity: minimum flow regulations				
	2 Hydroelectricity: hydro peaking				
	3 Hydroelectricity: reservoir management				
	4 Hydroelectricity: bed load management				
	5 Hydroelectricity: power plant design				
	6 Hydroelectricity: ecological improvement fund				
	7 Hydroelectricity: equal treatment of all sizes of power plants				
	8 Electricity from wind				
	9 Electricity from photovoltaics				
	10 Electricity from biomass				
	11 Electricity from geothermal energy and tidal power plants				
	12 Electricity from waste				
	13 Exclusion of non-renewable electricity				
	14 Quality of renewables support scheme				
Social and economical criteria	15 No rivalry between electricity generation and food cultivation				
	16 Securing soil fertility and land use				
	17 Biomass tracking				
	18 Social criteria for dam building projects				
	19 Corporate social responsibility of electricity producer				
	20 Market share				

Process Criteria – Label: GreenPower (AU)

Category	Criteria	None	Low	Medium	High
Organisation and professionalism	1 Representation of industry				
	2 Representation of pressure groups				
	3 Guarantee of legal compliance				
	4 Audit by independent third party				
	5 Periodical revaluation of certification				
Balancing	6 Declaration of origin				
	7 Avoidance of double counting				
	8 Regulation for deficit in supply				
	9 Only net energy permitted				
	10 LCA verification				
Transparency	11 Availability of information on electricity quality				
	12 Communication and availability of criteria				
	13 Protection of consumer rights				

Figure 40: Illustration of an assessment of GreenPower (Source: PwC)

7.2 Umweltzeichen – Austria

Overview of labelling system

Name of label	Umweltzeichen
Responsible body	Bundesministerium für Land- und Forstwirtschaft, Umwelt und Wasserwirtschaft
Web page	www.umweltzeichen.at
Certification criteria	www.umweltzeichen.at/article/archive/15177
Name of auditing company	Several companies (see home page)
Energy sources which are eligible for certification and are audited by criteria	Solar, wind, biomass (wood, waste timber, biogenic material, agricultural biogas), geothermal energy, hydroelectric energy (run-of-the-river power plant, storage power plant)
Support scheme	None
Remarks	None

Table 39: Overview of Umweltzeichen (Source: PwC)

Label graph

Sustainability Criteria – Label: Umweltzeichen (AT)

Category	Criteria	None	Low	Medium	High
Ecological criteria	1 Hydroelectricity: minimum flow regulations				
	2 Hydroelectricity: hydro peaking				
	3 Hydroelectricity: reservoir management				
	4 Hydroelectricity: bed load management				
	5 Hydroelectricity: power plant design				
	6 Hydroelectricity: ecological improvement fund				
	7 Hydroelectricity: equal treatment of all sizes of power plants				
	8 Electricity from wind				
	9 Electricity from photovoltaics				
	10 Electricity from biomass				
	11 Electricity from geothermal energy and tidal power plants				
	12 Electricity from waste				
	13 Exclusion of non-renewable electricity				
	14 Quality of renewables support scheme				
Social and economical criteria	15 No rivalry between electricity generation and food cultivation				
	16 Securing soil fertility and land use				
	17 Biomass tracking				
	18 Social criteria for dam building projects				
	19 Corporate social responsibility of electricity producer				
	20 Market share				

Process Criteria – Label: Umweltzeichen (AT)

Category	Criteria	None	Low	Medium	High
Organisation and professionalism	1 Representation of industry				
	2 Representation of pressure groups				
	3 Guarantee of legal compliance				
	4 Audit by independent third party				
	5 Periodical revaluation of certification				
Balancing	6 Declaration of origin				
	7 Avoidance of double counting				
	8 Regulation for deficit in supply				
	9 Only net energy permitted				
	10 LCA verification				
Transparency	11 Availability of information on electricity quality				
	12 Communication and availability of criteria				
	13 Protection of consumer rights				

Figure 41: Illustration of an assessment of Umweltzeichen (Source: PwC)

7.3 EcoLogo – Canada

Overview of labelling system

Name of label	EcoLogo
Responsible body	Canadian Government
Web page	www.ecologo.org
Certification criteria	www.ecologo.org/en/seeourcriteria
Name of auditing company	Global EcoLabelling Network (GEN) through their GENICES accreditation programme to ensure compliance with ISO 14024 principles
Energy sources which are eligible for certification and are audited by criteria	Solar, wind, biomass (wood, waste timber, biogenic material), hydroelectric energy
Support scheme	■ No support for the production of renewable energy ■ Full benefit of the programme goes to: □ Third party validation □ Consulting and information support □ Advertising and promotion □ Market research ■ Object of the support scheme is to assist companies market and sell their products
Remarks	None

Table 40: Overview of EcoLogo (Source: PwC)

Label graph

Sustainability Criteria – Label: EcoLogo (CA)

Category	Criteria	None	Low	Medium	High
Ecological criteria	1 Hydroelectricity: minimum flow regulations				
	2 Hydroelectricity: hydro peaking				
	3 Hydroelectricity: reservoir management				
	4 Hydroelectricity: bed load management				
	5 Hydroelectricity: power plant design				
	6 Hydroelectricity: ecological improvement fund				
	7 Hydroelectricity: equal treatment of all sizes of power plants				
	8 Electricity from wind				
	9 Electricity from photovoltaics				
	10 Electricity from biomass				
	11 Electricity from geothermal energy and tidal power plants				
	12 Electricity from waste				
	13 Exclusion of non-renewable electricity				
	14 Quality of renewables support scheme				
Social and economical criteria	15 No rivalry between electricity generation and food cultivation				
	16 Securing soil fertility and land use				
	17 Biomass tracking				
	18 Social criteria for dam building projects				
	19 Corporate social responsibility of electricity producer				
	20 Market share				

Process Criteria – Label: EcoLogo (CA)

Category	Criteria	None	Low	Medium	High
Organisation and professionalism	1 Representation of industry				
	2 Representation of pressure groups				
	3 Guarantee of legal compliance				
	4 Audit by independent third party				
	5 Periodical revaluation of certification				
Balancing	6 Declaration of origin				
	7 Avoidance of double counting				
	8 Regulation for deficit in supply				
	9 Only net energy permitted				
	10 LCA verification				
Transparency	11 Availability of information on electricity quality				
	12 Communication and availability of criteria				
	13 Protection of consumer rights				

Figure 42: Illustration of an assessment of EcoLogo (Source: PwC)

7.4 Jade Electricity – China

Overview of labelling system

Name of label	Jade Electricity (experimental status)
Responsible body	The Power Grid Company; Shanghai Energy Conservation Supervision Center
Web page	www.sgcc.com.cn
Certification criteria	None
Name of auditing company	None
Energy sources which are eligible for certification and are audited by criteria	Solar, wind, biomass (biogenic material), geothermal energy, hydroelectric energy (run-of-the-river power plant, storage power plant, wave and tidal power plant)
Support scheme	Government guarantees that the additional payments are used to develop additional green electricity
Remarks	In the experimental phase

Table 41: Overview of Jade electricity (Source: PwC)

The Jade Electricity green electricity scheme is still an experimental process and limited to Shanghai City. Detailed information is not publicly available as yet but consumer response seems to be limited.

Shanghai is not only the first city with a renewable electricity support scheme in China but also the only one. At present, the voluntary users are encouraged by the local government to purchase the renewable electricity. A minimum of kWh has to be purchased annually as defined in the support scheme both for corporate and private consumers.

Label graph

No information is available about the label criteria so no label graph can be shown.

7.5 Norppaenergia – Finland

Overview of labelling system

Name of label	Norppaenergia
Responsible body	Finnish Association for Nature Conservation (FANC)
Web page	www.norppaenergia.fi
Certification criteria	www.norppaenergia.fi/english/criteria
Name of auditing company	None
Energy sources which are eligible for certification and are audited by criteria	Solar, wind, biomass (wood, waste timber, biogenic material, agricultural biogas, sewage gas, waste sludge from pulp and paper production), geothermal energy, hydroelectric energy (run-of-the-river-power-plant, storage power plant, wave and tidal power plant)
Support scheme	None
Remarks	None

Table 42: Overview of Norppaenergia (Source: PwC)

Label graph

Sustainability Criteria – Label: Norppaenergia (FI)

Category	Criteria	None	Low	Medium	High
Ecological criteria	1 Hydroelectricity: minimum flow regulations				
	2 Hydroelectricity: hydro peaking				
	3 Hydroelectricity: reservoir management				
	4 Hydroelectricity: bed load management				
	5 Hydroelectricity: power plant design				
	6 Hydroelectricity: ecological improvement fund				
	7 Hydroelectricity: equal treatment of all sizes of power plants				
	8 Electricity from wind				
	9 Electricity from photovoltaics				
	10 Electricity from biomass				
	11 Electricity from geothermal energy and tidal power plants				
	12 Electricity from waste				
	13 Exclusion of non-renewable electricity				
	14 Quality of renewables support scheme				
Social and economical criteria	15 No rivalry between electricity generation and food cultivation				
	16 Securing soil fertility and land use				
	17 Biomass tracking				
	18 Social criteria for dam building projects				
	19 Corporate social responsibility of electricity producer				
	20 Market share				

Process Criteria – Label: Norppaenergia (FI)

Category	Criteria	None	Low	Medium	High
Organisation and professionalism	1 Representation of industry				
	2 Representation of pressure groups				
	3 Guarantee of legal compliance				
	4 Audit by independent third party				
	5 Periodical revaluation of certification				
Balancing	6 Declaration of origin				
	7 Avoidance of double counting				
	8 Regulation for deficit in supply				
	9 Only net energy permitted				
	10 LCA verification				
Transparency	11 Availability of information on electricity quality				
	12 Communication and availability of criteria				
	13 Protection of consumer rights				

Figure 43: Illustration of an assessment of Norppaenergia (Source: PwC)

7.6 EVE – Electricité Verte – France

Overview of labelling system

Name of label	EVE – Electricité Verte
Responsible body	WWF France – CLER coordination committee for renewable energies
Web page	www.electricite-verte.info
Certification criteria	www.electricite-verte.info/IMG/pdf/Criteres6.pdf
Name of auditing company	WWF France
Energy sources which are eligible for certification and are audited by criteria	Solar, wind, biomass (wood, waste timber, agricultural biogas), geothermal energy, hydroelectric energy
Support scheme	Based on a monetary system to develop electricity from renewable sources
Remarks	So far EVE – Electricité Verte has not certified any electricity. The label is in the process of setting up its criteria. The findings below may change substantially in the near the future

Table 43: Overview of EVE – Electricité Verte (Source: PwC)

Label graph

Sustainability Criteria – Label: EVE – Electricité Verte (FR)

Category	Criteria	None	Low	Medium	High
Ecological criteria	1 Hydroelectricity: minimum flow regulations				
	2 Hydroelectricity: hydro peaking				
	3 Hydroelectricity: reservoir management				
	4 Hydroelectricity: bed load management				
	5 Hydroelectricity: power plant design				
	6 Hydroelectricity: ecological improvement fund				
	7 Hydroelectricity: equal treatment of all sizes of power plants				
	8 Electricity from wind				
	9 Electricity from photovoltaics				
	10 Electricity from biomass				
	11 Electricity from geothermal energy and tidal power plants				
	12 Electricity from waste				
	13 Exclusion of non-renewable electricity				
	14 Quality of renewables support scheme				
Social and economical criteria	15 No rivalry between electricity generation and food cultivation				
	16 Securing soil fertility and land use				
	17 Biomass tracking				
	18 Social criteria for dam building projects				
	19 Corporate social responsibility of electricity producer				
	20 Market share				

Process Criteria – Label: EVE – Electricité Verte (FR)

Category	Criteria	None	Low	Medium	High
Organisation and professionalism	1 Representation of industry				
	2 Representation of pressure groups				
	3 Guarantee of legal compliance				
	4 Audit by independent third party				
	5 Periodical revaluation of certification				
Balancing	6 Declaration of origin				
	7 Avoidance of double counting				
	8 Regulation for deficit in supply				
	9 Only net energy permitted				
Transparency	10 LCA verification				
	11 Availability of information on electricity quality				
	12 Communication and availability of criteria				
	13 Protection of consumer rights				

Figure 44: Illustration of an assessment of EVE – Electricité Verte (Source: PwC)

7.7 Grüner Strom Label – Germany

Overview of labelling system

Name of label	Grüner Strom Label
Responsible body	Grüner Strom Label e.V.
Web page	www.gruenerstromlabel.de
Certification criteria	www.gruenerstromlabel.de/index.php?option=com_content&task=view&id=55&Itemid=74
Name of auditing company	Zentrum für Sonnenenergie- und Wasserstoff-Forschung
Energy sources which are eligible for certification and are audited by criteria	Solar, wind, biomass, biogas, geothermal energy, hydroelectric energy, fossil-fuelled combined heat and power generation (with exceptions, see remarks)
Support scheme	■ Monetary support scheme; intends to support the introduction to market of renewable electricity and electricity from combined heat and power plants (CHP electricity). ■ New installations can receive support via: □ ongoing additional payments supplementing existing feed-in payments □ the payment of investment aid □ the use of support payments to partially cover investment costs or as a loan to an external operator with repayment of feed-in payments to the relevant internal support fund of the label user. ■ Further financing concepts can be arranged subject to agreement with Grüner Strom Label e.V.
Remarks	Grüner Strom has two types of labels: a gold level and a silver level. The difference between the two levels is that the gold level excludes electricity that comes from fossil resources whereas the silver level does not (confined to combined heat and power generation at maximum share of up to 50%). The graph on the next page relates to the gold level.

Table 44: Overview of Grüner Strom Label (Source: PwC)

Label graph

Sustainability Criteria – Label: Grüner Strom Label (DE)

Category	Criteria	None	Low	Medium	High
Ecological criteria	1 Hydroelectricity: minimum flow regulations				
	2 Hydroelectricity: hydro peaking				
	3 Hydroelectricity: reservoir management				
	4 Hydroelectricity: bed load management				
	5 Hydroelectricity: power plant design				
	6 Hydroelectricity: ecological improvement fund				
	7 Hydroelectricity: equal treatment of all sizes of power plants				
	8 Electricity from wind				
	9 Electricity from photovoltaics				
	10 Electricity from biomass				
	11 Electricity from geothermal energy and tidal power plants				
	12 Electricity from waste				
	13 Exclusion of non-renewable electricity				
	14 Quality of renewables support scheme				
Social and economical criteria	15 No rivalry between electricity generation and food cultivation				
	16 Securing soil fertility and land use				
	17 Biomass tracking				
	18 Social criteria for dam building projects				
	19 Corporate social responsibility of electricity producer				
	20 Market share				

Process Criteria – Label: Grüner Strom Label (DE)

Category	Criteria	None	Low	Medium	High
Organisation and professionalism	1 Representation of industry				
	2 Representation of pressure groups				
	3 Guarantee of legal compliance				
	4 Audit by independent third party				
	5 Periodical revaluation of certification				
Balancing	6 Declaration of origin				
	7 Avoidance of double counting				
	8 Regulation for deficit in supply				
	9 Only net energy permitted				
	10 LCA verification				
Transparency	11 Availability of information on electricity quality				
	12 Communication and availability of criteria				
	13 Protection of consumer rights				

Figure 45: Illustration of an assessment of Grüner Strom Label (Source: PwC)

7.8 ok-power – Germany

Overview of labelling system

Name of label	ok-power
Responsible body	Energie Vision e.V.
Web page	www.energie-vision.de
Certification criteria	www.energie-vision.de/downloads/ok-power-Kriterien_6-5.pdf
Name of auditing company	ECOFYS Germany GmbH, Institut für Solare Energieversorgungstechnologien (ISET), Swiss TS Technical Services AG, TÜV Nord Umweltschutz GmbH & Co. KG, TÜV SÜD
Energy sources which are eligible for certification and are audited by criteria	Solar, wind, biomass, hydroelectric energy (run-of-the-river power plant, reactivated or reconstructed power plant)
Support scheme	■ Monetary support schemes with objective of supporting new plants (new plants = plants not more than 6 years old and of which the environmental benefit per kWh is less than 0.75 ct.) ■ Two different types of support schemes exist: A trader scheme and a fund scheme. Under the trader scheme the electricity sellers are allowed to offer labelled electricity to customers but are obliged to meet certain restrictions, such as to provide one third of the electricity from plants not less than six years old. Under the fund scheme the customers' surplus paid for the labelled electricity goes into a fund that supports new renewable power plants. For more information please refer to www.energie-vision.de/?show=infos&sub=okpower
Remarks	ok-power does not exclude electricity from fossil resources and includes highly efficient gas-fired CHPs (combined heat and power unit). The label argues that CHPs are far better than the very common coal-fired power plants in Germany and therefore should bear the label.

Table 45: Overview of ok-power (Source: PwC)

Label graph

Sustainability Criteria – Label: ok-power (DE)

Category	Criteria	None	Low	Medium	High
Ecological criteria	1 Hydroelectricity: minimum flow regulations				
	2 Hydroelectricity: hydro peaking				
	3 Hydroelectricity: reservoir management				
	4 Hydroelectricity: bed load management				
	5 Hydroelectricity: power plant design				
	6 Hydroelectricity: ecological improvement fund				
	7 Hydroelectricity: equal treatment of all sizes of power plants				
	8 Electricity from wind				
	9 Electricity from photovoltaics				
	10 Electricity from biomass				
	11 Electricity from geothermal energy and tidal power plants				
	12 Electricity from waste				
	13 Exclusion of non-renewable electricity				
	14 Quality of renewables support scheme				
Social and economical criteria	15 No rivalry between electricity generation and food cultivation				
	16 Securing soil fertility and land use				
	17 Biomass tracking				
	18 Social criteria for dam building projects				
	19 Corporate social responsibility of electricity producer				
	20 Market share				

Process Criteria – Label: ok-power (DE)

Category	Criteria	None	Low	Medium	High
Organisation and professionalism	1 Representation of industry				
	2 Representation of pressure groups				
	3 Guarantee of legal compliance				
	4 Audit by independent third party				
	5 Periodical revaluation of certification				
Balancing	6 Declaration of origin				
	7 Avoidance of double counting				
	8 Regulation for deficit in supply				
	9 Only net energy permitted				
	10 LCA verification				
Transparency	11 Availability of information on electricity quality				
	12 Communication and availability of criteria				
	13 Protection of consumer rights				

Figure 46: Illustration of an assessment of ok-power (Source: PwC)

7.9 Öko-Strom – Germany

Overview of labelling system

Name of label	Öko-Strom
Responsible body	Landesgewerbeanstalt Bayern
Web page	lga.de
Certification criteria	www.izu.bayern.de/download/pdf/LGA_Info_Service_Oeko-Strom.pdf
Name of auditing company	Sachverständige der Landesgewerbeanstalt Bayern
Energy sources which are eligible for certification and are audited by criteria	Solar, wind, biomass, geothermal energy, hydroelectric energy, landfill gas, CHP (combined heat and power unit)
Support scheme	A quota scheme supports new plants ■ There are two categories: □ “Öko-Strom regenerativ” requires investments to be made in new installations based on a market forecast and proof of security of supply; no fossil powered CHP allowed □ “Öko-Strom effektiv” demands at least 25% of electricity from renewable energy sources, the rest can be generated by CHP; investments in new installations have to be based on a market forecast
Remarks	None

Table 46: Overview of Öko-Strom (Source: PwC)

Label graph

No information is available about the label criteria so no label graph can be shown.

7.10 TÜV Nord – Germany

Overview of labelling system

Name of label	TÜV Nord
Responsible body	TÜV Nord
Web page	www.tuev-nord.de
Certification criteria	www.tuev-nord.de/49105.asp
Name of auditing company	None
Energy sources which are eligible for certification and are audited by criteria	n/a
Support scheme	None
Remarks	None

Table 47: Overview of TÜV Nord (Source: PwC)

Label graph

No information is available about the label criteria so no label graph can be shown.

7.11 TÜV SÜD – Germany

Overview of labelling system

Name of label	TÜV SÜD: EE01, EE02, Generation EE and Generation EE+
Responsible body	Certification body “climate and energy” of TÜV SÜD
Web page	www.tuev-sued.de
Certification criteria	www.tuv.com/web/media_get.php?mediaid=2504&fileid=2607
Name of auditing company	TÜV SÜD Industrie Service, TÜV Hessen and SwissTS
Energy sources which are eligible for certification and are audited by criteria	Solar, wind, biomass, geothermal energy, hydroelectric energy (storage power plant), landfill gas
Support scheme	■ Financially supports new plants that generate electricity from renewable energy sources. ■ New plants must generate energy from biogas, biomass, landfill gas, water (storage power station only in combination with renewable energy sources), wind or solar and must not be large power plants. ■ Certified companies must ensure that additional revenues are channelled into the promotion of renewable energies, particularly the development of new installations.
Remarks	■ TÜV SÜD has seven different labels. EE01, EE02, Generation EE and Generation EE+; Generation UE, UE01 and UE02. The three labels Generation UE, UE01 and UE02 permit the use of fossil resources (CHP: combined heat and power unit) and have not been included in this survey. ■ EE01 and EE02 label ecological electricity. EE01 requires 25% of the electricity supply to be from newly built power plants not more than 3 years old at the time of initial certification. EE02 has stricter criteria for a deficit in supply than EE01 (simultaneous supply every 15 minutes). Generation EE and EE+ label ecological electricity producers. Generation EE and EE+ are very similar products. The difference is that Generation EE+ has additional criteria that should ensure the performance of the electricity producer. ■ The labels from TÜV SÜD are available in Austria, Germany, Switzerland, Croatia, France, Iceland, Italy and Norway.

Table 48: Overview of TÜV SÜD (Source: PwC)

Label graph

7.11.1 TÜV SÜD EE01 – Germany

Sustainability Criteria – Label: TÜV SÜD EE01 (DE)

Category	Criteria	None	Low	Medium	High
Ecological criteria	1 Hydroelectricity: minimum flow regulations				
	2 Hydroelectricity: hydro peaking				
	3 Hydroelectricity: reservoir management				
	4 Hydroelectricity: bed load management				
	5 Hydroelectricity: power plant design				
	6 Hydroelectricity: ecological improvement fund				
	7 Hydroelectricity: equal treatment of all sizes of power plants				
	8 Electricity from wind				
	9 Electricity from photovoltaics				
	10 Electricity from biomass				
	11 Electricity from geothermal energy and tidal power plants				
	12 Electricity from waste				
	13 Exclusion of non-renewable electricity				
	14 Quality of renewables support scheme				
Social and economical criteria	15 No rivalry between electricity generation and food cultivation				
	16 Securing soil fertility and land use				
	17 Biomass tracking				
	18 Social criteria for dam building projects				
	19 Corporate social responsibility of electricity producer				
	20 Market share				

Process Criteria – Label: TÜV SÜD EE01 (DE)

Category	Criteria	None	Low	Medium	High
Organisation and professionalism	1 Representation of industry				
	2 Representation of pressure groups				
	3 Guarantee of legal compliance				
	4 Audit by independent third party				
	5 Periodical revaluation of certification				
Balancing	6 Declaration of origin				
	7 Avoidance of double counting				
	8 Regulation for deficit in supply				
	9 Only net energy permitted				
	10 LCA verification				
Transparency	11 Availability of information on electricity quality				
	12 Communication and availability of criteria				
	13 Protection of consumer rights				

Figure 47: Illustration of an assessment of TÜV SÜD EE01 (Source: PwC)

7.11.2 TÜV SÜD EE02 – Germany

Sustainability Criteria – Label: TÜV SÜD EE02 (DE)

Category	Criteria	None	Low	Medium	High
Ecological criteria	1 Hydroelectricity: minimum flow regulations				
	2 Hydroelectricity: hydro peaking				
	3 Hydroelectricity: reservoir management				
	4 Hydroelectricity: bed load management				
	5 Hydroelectricity: power plant design				
	6 Hydroelectricity: ecological improvement fund				
	7 Hydroelectricity: equal treatment of all sizes of power plants				
	8 Electricity from wind				
	9 Electricity from photovoltaics				
	10 Electricity from biomass				
	11 Electricity from geothermal energy and tidal power plants				
	12 Electricity from waste				
	13 Exclusion of non-renewable electricity				
	14 Quality of renewables support scheme				
Social and economical criteria	15 No rivalry between electricity generation and food cultivation				
	16 Securing soil fertility and land use				
	17 Biomass tracking				
	18 Social criteria for dam building projects				
	19 Corporate social responsibility of electricity producer				
	20 Market share				

Process Criteria – Label: TÜV SÜD EE02 (DE)

Category	Criteria	None	Low	Medium	High
Organisation and professionalism	1 Representation of industry				
	2 Representation of pressure groups				
	3 Guarantee of legal compliance				
	4 Audit by independent third party				
	5 Periodical revaluation of certification				
Balancing	6 Declaration of origin				
	7 Avoidance of double counting				
	8 Regulation for deficit in supply				
	9 Only net energy permitted				
	10 LCA verification				
Transparency	11 Availability of information on electricity quality				
	12 Communication and availability of criteria				
	13 Protection of consumer rights				

Figure 48: Illustration of an assessment of TÜV SÜD EE02 (Source: PwC)

7.11.3 TÜV SÜD Generation EE+ – Germany

Sustainability Criteria – Label: TÜV SÜD Generation EE+ (DE)

Category	Criteria	None	Low	Medium	High
Ecological criteria	1 Hydroelectricity: minimum flow regulations				
	2 Hydroelectricity: hydro peaking				
	3 Hydroelectricity: reservoir management				
	4 Hydroelectricity: bed load management				
	5 Hydroelectricity: power plant design				
	6 Hydroelectricity: ecological improvement fund				
	7 Hydroelectricity: equal treatment of all sizes of power plants				
	8 Electricity from wind				
	9 Electricity from photovoltaics				
	10 Electricity from biomass				
	11 Electricity from geothermal energy and tidal power plants				
	12 Electricity from waste				
	13 Exclusion of non-renewable electricity				
	14 Quality of renewables support scheme				
Social and economical criteria	15 No rivalry between electricity generation and food cultivation				
	16 Securing soil fertility and land use				
	17 Biomass tracking				
	18 Social criteria for dam building projects				
	19 Corporate social responsibility of electricity producer				
	20 Market share				

Process Criteria – Label: TÜV SÜD Generation EE+ (DE)

Category	Criteria	None	Low	Medium	High
Organisation and professionalism	1 Representation of industry				
	2 Representation of pressure groups				
	3 Guarantee of legal compliance				
	4 Audit by independent third party				
	5 Periodical revaluation of certification				
Balancing	6 Declaration of origin				
	7 Avoidance of double counting				
	8 Regulation for deficit in supply				
	9 Only net energy permitted				
	10 LCA verification				
Transparency	11 Availability of information on electricity quality				
	12 Communication and availability of criteria				
	13 Protection of consumer rights				

Figure 49: Illustration of an assessment of TÜV SÜD Generation EE+ (Source: PwC)

7.11.4 TÜV SÜD Generation EE – Germany

Sustainability Criteria – Label: TÜV SÜD Generation EE (DE)

Category	Criteria	None	Low	Medium	High
Ecological criteria	1 Hydroelectricity: minimum flow regulations				
	2 Hydroelectricity: hydro peaking				
	3 Hydroelectricity: reservoir management				
	4 Hydroelectricity: bed load management				
	5 Hydroelectricity: power plant design				
	6 Hydroelectricity: ecological improvement fund				
	7 Hydroelectricity: equal treatment of all sizes of power plants				
	8 Electricity from wind				
	9 Electricity from photovoltaics				
	10 Electricity from biomass				
	11 Electricity from geothermal energy and tidal power plants				
	12 Electricity from waste				
	13 Exclusion of non-renewable electricity				
	14 Quality of renewables support scheme				
Social and economical criteria	15 No rivalry between electricity generation and food cultivation				
	16 Securing soil fertility and land use				
	17 Biomass tracking				
	18 Social criteria for dam building projects				
	19 Corporate social responsibility of electricity producer				
	20 Market share				

Process Criteria – Label: TÜV SÜD Generation EE (DE)

Category	Criteria	None	Low	Medium	High
Organisation and professionalism	1 Representation of industry				
	2 Representation of pressure groups				
	3 Guarantee of legal compliance				
	4 Audit by independent third party				
	5 Periodical revaluation of certification				
Balancing	6 Declaration of origin				
	7 Avoidance of double counting				
	8 Regulation for deficit in supply				
	9 Only net energy permitted				
	10 LCA verification				
Transparency	11 Availability of information on electricity quality				
	12 Communication and availability of criteria				
	13 Protection of consumer rights				

Figure 50: Illustration of an assessment of TÜV SÜD Generation EE (Source: PwC)

7.12 100% energia verde – Italy

Overview of labelling system

Name of label	100% energia verde
Responsible body	REEF Onlus
Web page	www.centopercentoverde.org
Certification criteria	www.centopercentoverde.org/pages/documenti.php
Name of auditing company	None
Energy sources which are eligible for certification and are audited by criteria	Solar, wind, biomass, geothermal energy, hydroelectric energy
Support scheme	None
Remarks	None

Table 49: Overview of 100% energia verde (Source: PwC)

Label graph

Sustainability Criteria – Label: 100% energia verde (IT)

Category	Criteria	None	Low	Medium	High
Ecological criteria	1 Hydroelectricity: minimum flow regulations				
	2 Hydroelectricity: hydro peaking				
	3 Hydroelectricity: reservoir management				
	4 Hydroelectricity: bed load management				
	5 Hydroelectricity: power plant design				
	6 Hydroelectricity: ecological improvement fund				
	7 Hydroelectricity: equal treatment of all sizes of power plants				
	8 Electricity from wind				
	9 Electricity from photovoltaics				
	10 Electricity from biomass				
	11 Electricity from geothermal energy and tidal power plants				
	12 Electricity from waste				
	13 Exclusion of non-renewable electricity				
	14 Quality of renewables support scheme				
Social and economical criteria	15 No rivalry between electricity generation and food cultivation				
	16 Securing soil fertility and land use				
	17 Biomass tracking				
	18 Social criteria for dam building projects				
	19 Corporate social responsibility of electricity producer				
	20 Market share				

Process Criteria – Label: 100% energia verde (IT)

Category	Criteria	None	Low	Medium	High
Organisation and professionalism	1 Representation of industry				
	2 Representation of pressure groups				
	3 Guarantee of legal compliance				
	4 Audit by independent third party				
	5 Periodical revaluation of certification				
Balancing	6 Declaration of origin				
	7 Avoidance of double counting				
	8 Regulation for deficit in supply				
	9 Only net energy permitted				
	10 LCA verification				
Transparency	11 Availability of information on electricity quality				
	12 Communication and availability of criteria				
	13 Protection of consumer rights				

Figure 51: Illustration of an assessment of 100% energia verde (Source: PwC)

7.13 Green Power Certification System – Japan

Overview of labelling system

Name of label	Green Power Certification System
Responsible body	Japan Natural Energy Company Ltd.
Web page	www.natural-e.co.jp/english/index.html
Certification criteria	eneken.iecej.or.jp/greenpower/eng/index.htm
Name of auditing company	The Green Energy Certification Center (formerly Green Power Certification Council, Japan)
Energy sources which are eligible for certification and are audited by criteria	Solar, wind, biomass (wood, waste timber, biogenic material, agricultural biogas, sewage gas), geothermal energy, hydroelectric energy (run-of-the-river power plant), waste incineration (partly from renewable energy sources)
Support scheme	None
Remarks	None

Table 50: Overview of Green Power Certification System (Source: PwC)

Label graph

Sustainability Criteria – Label: Green Power Certification System (JP)

Category	Criteria	None	Low	Medium	High
Ecological criteria	1 Hydroelectricity: minimum flow regulations				
	2 Hydroelectricity: hydro peaking				
	3 Hydroelectricity: reservoir management				
	4 Hydroelectricity: bed load management				
	5 Hydroelectricity: power plant design				
	6 Hydroelectricity: ecological improvement fund				
	7 Hydroelectricity: equal treatment of all sizes of power plants				
	8 Electricity from wind				
	9 Electricity from photovoltaics				
	10 Electricity from biomass				
	11 Electricity from geothermal energy and tidal power plants				
	12 Electricity from waste				
	13 Exclusion of non-renewable electricity				
	14 Quality of renewables support scheme				
Social and economical criteria	15 No rivalry between electricity generation and food cultivation				
	16 Securing soil fertility and land use				
	17 Biomass tracking				
	18 Social criteria for dam building projects				
	19 Corporate social responsibility of electricity producer				
	20 Market share				

Process Criteria – Label: Green Power Certification System (JP)

Category	Criteria	None	Low	Medium	High
Organisation and professionalism	1 Representation of industry				
	2 Representation of pressure groups				
	3 Guarantee of legal compliance				
	4 Audit by independent third party				
	5 Periodical revaluation of certification				
Balancing	6 Declaration of origin				
	7 Avoidance of double counting				
	8 Regulation for deficit in supply				
	9 Only net energy permitted				
	10 LCA verification				
Transparency	11 Availability of information on electricity quality				
	12 Communication and availability of criteria				
	13 Protection of consumer rights				

Figure 52: Illustration of an assessment of Green Power Certification System (Source: PwC)

7.14 Milieukeur Groene Elektriciteit – The Netherlands

Overview of labelling system

Name of label	Milieukeur Groene Elektriciteit
Responsible body	Stichting Milieukeur
Web page	www.milieukeur.nl
Certification criteria	www.milieukeur.nl/nl-NL/Content.aspx?type=criteria&id=8
Name of auditing company	DNV Certification B.V. (www.dnv.com)
Energy sources which are eligible for certification and are audited by criteria	Solar, wind, biomass (wood, waste timber, biogenic material, agricultural biogas, sewage gas), hydroelectric energy (run-of-the-river-power-plant, storage power plant, wave and tidal power plant), landfill gas
Support scheme	■ Quota support scheme
Remarks	Currently working on fine-tuning and extending the criteria of the label

Table 51: Overview of Milieukeur Groene Elektriciteit (Source: PwC)

Label graph

Sustainability Criteria – Label: Milieukeur Groene Elektriciteit (NL)

Category	Criteria	None	Low	Medium	High
Ecological criteria	1 Hydroelectricity: minimum flow regulations				
	2 Hydroelectricity: hydro peaking				
	3 Hydroelectricity: reservoir management				
	4 Hydroelectricity: bed load management				
	5 Hydroelectricity: power plant design				
	6 Hydroelectricity: ecological improvement fund				
	7 Hydroelectricity: equal treatment of all sizes of power plants				
	8 Electricity from wind				
	9 Electricity from photovoltaics				
	10 Electricity from biomass				
	11 Electricity from geothermal energy and tidal power plants				
	12 Electricity from waste				
	13 Exclusion of non-renewable electricity				
	14 Quality of renewables support scheme				
Social and economical criteria	15 No rivalry between electricity generation and food cultivation				
	16 Securing soil fertility and land use				
	17 Biomass tracking				
	18 Social criteria for dam building projects				
	19 Corporate social responsibility of electricity producer				
	20 Market share				

Process Criteria – Label: Milieukeur Groene Elektriciteit (NL)

Category	Criteria	None	Low	Medium	High
Organisation and professionalism	1 Representation of industry				
	2 Representation of pressure groups				
	3 Guarantee of legal compliance				
	4 Audit by independent third party				
	5 Periodical revaluation of certification				
Balancing	6 Declaration of origin				
	7 Avoidance of double counting				
	8 Regulation for deficit in supply				
	9 Only net energy permitted				
	10 LCA verification				
Transparency	11 Availability of information on electricity quality				
	12 Communication and availability of criteria				
	13 Protection of consumer rights				

Figure 53: Illustration of an assessment of Milieukeur Groene Elektriciteit (Source: PwC)

7.15 Bra Miljöval – Sweden

Overview of labelling system

Name of label	Bra Miljöval
Responsible body	Swedish Society for Nature Conservation (SSNC)
Web page	www.bramiljoval.org
Certification criteria	www2.snf.se/bmv/elleveranser-kriterier.cfm
Name of auditing company	Different accredited auditors and SSNC
Energy sources which are eligible for certification and are audited by criteria	Solar, wind, biomass (wood, biogenic material, agricultural biogas), geothermal energy, hydroelectric energy (run-of-the-river power plant, storage power plant, wave and tidal power plant), waste incineration (partly from renewable energy sources)
Support scheme	■ Supports new plants for electricity generated from renewable energy sources (operating since introduction of new criteria in 2002) ■ Each product must include 5% renewable non-hydropower; in most cases wind power ■ In 2009, introduction of monetary fund model
Remarks	None

Table 52: Overview of Bra Miljöval (Source: PwC)

Label graph

Sustainability Criteria – Label: Bra Miljöval (SE)

Category	Criteria	None	Low	Medium	High
Ecological criteria	1 Hydroelectricity: minimum flow regulations				
	2 Hydroelectricity: hydro peaking				
	3 Hydroelectricity: reservoir management				
	4 Hydroelectricity: bed load management				
	5 Hydroelectricity: power plant design				
	6 Hydroelectricity: ecological improvement fund				
	7 Hydroelectricity: equal treatment of all sizes of power plants				
	8 Electricity from wind				
	9 Electricity from photovoltaics				
	10 Electricity from biomass				
	11 Electricity from geothermal energy and tidal power plants				
	12 Electricity from waste				
	13 Exclusion of non-renewable electricity				
	14 Quality of renewables support scheme				
Social and economical criteria	15 No rivalry between electricity generation and food cultivation				
	16 Securing soil fertility and land use				
	17 Biomass tracking				
	18 Social criteria for dam building projects				
	19 Corporate social responsibility of electricity producer				
	20 Market share				

Process Criteria – Label: Bra Miljöval (SE)

Category	Criteria	None	Low	Medium	High
Organisation and professionalism	1 Representation of industry				
	2 Representation of pressure groups				
	3 Guarantee of legal compliance				
	4 Audit by independent third party				
	5 Periodical revaluation of certification				
Balancing	6 Declaration of origin				
	7 Avoidance of double counting				
	8 Regulation for deficit in supply				
	9 Only net energy permitted				
	10 LCA verification				
Transparency	11 Availability of information on electricity quality				
	12 Communication and availability of criteria				
	13 Protection of consumer rights				

Figure 54: Illustration of an assessment of Bra Miljöval (Source: PwC)

7.16 naturemade – Switzerland

Overview of labelling system

Name of label	Naturemade basic and naturemade star
Responsible body	VUE (Verein für umweltgerechte Energie)
Web page	www.naturemade.ch
Certification criteria	www.naturemade.ch
Name of auditing company	SQS, SwissTS, TÜV SÜD
Energy sources which are eligible for certification and are audited by criteria	Solar, wind, biomass (wood, waste timber, biogenic material, agricultural biogas, sewage gas), hydroelectric energy (run-of-the-river power plant, storage power plant), waste incineration (partly from renewable energy sources)
Support scheme	■ At least 5% of the total amount of naturemade basic electricity a supplier procures must be naturemade star certified electricity, whereof 50% must be produced in new installations (built after 1995) ■ At least 2.5% of the total amount of naturemade star electricity a supplier procures must be produced in new installations (built after 1995)
Remarks	Two quality standards: naturemade basic and naturemade star

Table 53: Overview of naturemade (Source: PwC)

Label graph

7.16.1 naturemade basic – Switzerland

Sustainability Criteria – Label: naturemade basic (CH)

Category	Criteria	None	Low	Medium	High
Ecological criteria	1 Hydroelectricity: minimum flow regulations				
	2 Hydroelectricity: hydro peaking				
	3 Hydroelectricity: reservoir management				
	4 Hydroelectricity: bed load management				
	5 Hydroelectricity: power plant design				
	6 Hydroelectricity: ecological improvement fund				
	7 Hydroelectricity: equal treatment of all sizes of power plants				
	8 Electricity from wind				
	9 Electricity from photovoltaics				
	10 Electricity from biomass				
	11 Electricity from geothermal energy and tidal power plants				
	12 Electricity from waste				
	13 Exclusion of non-renewable electricity				
	14 Quality of renewables support scheme				
Social and economical criteria	15 No rivalry between electricity generation and food cultivation				
	16 Securing soil fertility and land use				
	17 Biomass tracking				
	18 Social criteria for dam building projects				
	19 Corporate social responsibility of electricity producer				
	20 Market share				

Process Criteria – Label: naturemade basic (CH)

Category	Criteria	None	Low	Medium	High
Organisation and professionalism	1 Representation of industry				
	2 Representation of pressure groups				
	3 Guarantee of legal compliance				
	4 Audit by independent third party				
	5 Periodical revaluation of certification				
Balancing	6 Declaration of origin				
	7 Avoidance of double counting				
	8 Regulation for deficit in supply				
	9 Only net energy permitted				
	10 LCA verification				
Transparency	11 Availability of information on electricity quality				
	12 Communication and availability of criteria				
	13 Protection of consumer rights				

Figure 55: Illustration of an assessment of naturemade basic (Source: PwC)

7.16.2 naturemade star – Switzerland

Sustainability Criteria – Label: naturemade star (CH)

Category	Criteria	None	Low	Medium	High
Ecological criteria	1 Hydroelectricity: minimum flow regulations				
	2 Hydroelectricity: hydro peaking				
	3 Hydroelectricity: reservoir management				
	4 Hydroelectricity: bed load management				
	5 Hydroelectricity: power plant design				
	6 Hydroelectricity: ecological improvement fund				
	7 Hydroelectricity: equal treatment of all sizes of power plants				
	8 Electricity from wind				
	9 Electricity from photovoltaics				
	10 Electricity from biomass				
	11 Electricity from geothermal energy and tidal power plants				
	12 Electricity from waste				
	13 Exclusion of non-renewable electricity				
	14 Quality of renewables support scheme				
Social and economical criteria	15 No rivalry between electricity generation and food cultivation				
	16 Securing soil fertility and land use				
	17 Biomass tracking				
	18 Social criteria for dam building projects				
	19 Corporate social responsibility of electricity producer				
	20 Market share				

Process Criteria – Label: naturemade star (CH)

Category	Criteria	None	Low	Medium	High
Organisation and professionalism	1 Representation of industry				
	2 Representation of pressure groups				
	3 Guarantee of legal compliance				
	4 Audit by independent third party				
	5 Periodical revaluation of certification				
Balancing	6 Declaration of origin				
	7 Avoidance of double counting				
	8 Regulation for deficit in supply				
	9 Only net energy permitted				
	10 LCA verification				
Transparency	11 Availability of information on electricity quality				
	12 Communication and availability of criteria				
	13 Protection of consumer rights				

Figure 56: Illustration of an assessment of naturemade star (Source: PwC)

7.17 Green-e – USA

Overview of labelling system

Name of label	Green-e
Responsible body	Center for Resource Solutions
Web page	www.green-e.org
Certification criteria	www.green-e.org/getcert_re_stan.shtml
Name of auditing company	None
Energy sources which are eligible for certification and are audited by criteria	Solar, wind, biomass (wood, waste timber, biogenic material, agricultural biogas, sewage gas), geothermal energy, hydroelectric energy (run-of-the-river power plant, wave and tidal power plant), waste incineration (partly from renewable energy sources), landfill gas, CHP (combined heat and power unit), biodiesel
Support scheme	■ Only new renewables are eligible to meet Green-e standards ■ The term “new” is defined to include any eligible renewable facility beginning operation or repowered after January 1, 1997 ■ Certified products must contain at least the minimum amounts of Green-e eligible renewable energy defined in: 1) Percentage-of-Use Products and 2) Block Products ■ For more information please refer to : www.green-e.org/docs/energy/Appendix%20D_Green-e%20Energy%20National%20Standard.pdf
Remarks	None

Table 54: Overview of Green-e (Source: PwC)

Label graph

Sustainability Criteria – Label: Green-e (US)

Category	Criteria	None	Low	Medium	High
Ecological criteria	1 Hydroelectricity: minimum flow regulations				
	2 Hydroelectricity: hydro peaking				
	3 Hydroelectricity: reservoir management				
	4 Hydroelectricity: bed load management				
	5 Hydroelectricity: power plant design				
	6 Hydroelectricity: ecological improvement fund				
	7 Hydroelectricity: equal treatment of all sizes of power plants				
	8 Electricity from wind				
	9 Electricity from photovoltaics				
	10 Electricity from biomass				
	11 Electricity from geothermal energy and tidal power plants				
	12 Electricity from waste				
	13 Exclusion of non-renewable electricity				
	14 Quality of renewables support scheme				
Social and economical criteria	15 No rivalry between electricity generation and food cultivation				
	16 Securing soil fertility and land use				
	17 Biomass tracking				
	18 Social criteria for dam building projects				
	19 Corporate social responsibility of electricity producer				
	20 Market share				

Process Criteria – Label: Green-e (US)

Category	Criteria	None	Low	Medium	High
Organisation and professionalism	1 Representation of industry				
	2 Representation of pressure groups				
	3 Guarantee of legal compliance				
	4 Audit by independent third party				
	5 Periodical revaluation of certification				
Balancing	6 Declaration of origin				
	7 Avoidance of double counting				
	8 Regulation for deficit in supply				
	9 Only net energy permitted				
	10 LCA verification				
Transparency	11 Availability of information on electricity quality				
	12 Communication and availability of criteria				
	13 Protection of consumer rights				

Figure 57: Illustration of an assessment of Green-e (Source: PwC)

7.18 Power Scorecard – USA

Overview of labelling system

Name of label	Power Scorecard
Responsible body	Power Scorecard
Web page	Group of nationally recognised environmental organisations, see www.powerscorecard.org/scorecard.cfm
Certification criteria	www.powerscorecard.org/documents/ps_method.PDF (although it is a rating system and not a certification system)
Energy sources which are eligible for certification and are audited by criteria	Solar, wind, biomass, geothermal energy, hydroelectric energy (run-of-the-river power plant), waste incineration, landfill gas, CHP (combined heat and power unit)
Support scheme	■ Strong inducement for service providers to invest in new, low-impact, naturally recurring renewable and environmentally preferred energy facilities by showing a second rating for each product based on the size of such commitments ■ Qualifying new capacity will be counted from the time it is officially contracted ■ In the case of repowered capacity, only the net increase in kWh will be awarded ■ Verification that the resource has come on-line in accordance with the schedule is required. ■ The resource must be scored at the facility rather than by default ■ It will not qualify if it scores greater than five for any two of the eight rating criteria or receives penalty points
Remarks	The Power Scorecard is not a label in the strict sense – it is rather a methodology to grade the types of generation resources used to produce electricity according to their effects on the environment.

Table 55: Overview of Power Scorecard (Source: PwC)

Label graph

Sustainability Criteria – Label: Power Scorecard (US)

Category	Criteria	None	Low	Medium	High
Ecological criteria	1 Hydroelectricity: minimum flow regulations				
	2 Hydroelectricity: hydro peaking				
	3 Hydroelectricity: reservoir management				
	4 Hydroelectricity: bed load management				
	5 Hydroelectricity: power plant design				
	6 Hydroelectricity: ecological improvement fund				
	7 Hydroelectricity: equal treatment of all sizes of power plants				
	8 Electricity from wind				
	9 Electricity from photovoltaics				
	10 Electricity from biomass				
	11 Electricity from geothermal energy and tidal power plants				
	12 Electricity from waste				
	13 Exclusion of non-renewable electricity				
	14 Quality of renewables support scheme				
Social and economical criteria	15 No rivalry between electricity generation and food cultivation				
	16 Securing soil fertility and land use				
	17 Biomass tracking				
	18 Social criteria for dam building projects				
	19 Corporate social responsibility of electricity producer				
	20 Market share				

Process Criteria – Label: Power Scorecard (US)

Category	Criteria	None	Low	Medium	High
Organisation and professionalism	1 Representation of industry				
	2 Representation of pressure groups				
	3 Guarantee of legal compliance				
	4 Audit by independent third party				
	5 Periodical revaluation of certification				
Balancing	6 Declaration of origin				
	7 Avoidance of double counting				
	8 Regulation for deficit in supply				
	9 Only net energy permitted				
	10 LCA verification				
Transparency	11 Availability of information on electricity quality				
	12 Communication and availability of criteria				
	13 Protection of consumer rights				

Figure 58: Illustration of an assessment of Power Scorecard (Source: PwC)

8 Appendix

8.1 Trading certificates and energy certificate systems

In order to promote renewable electricity, voluntary and mandatory trading systems for producers of electricity from renewable energy sources have been introduced on a national and international level. These systems facilitate the trade of renewable electricity between producers and suppliers by providing standards and information about the electricity generation source.

Guarantee of Origin

Consumption of the product “electricity” can be characterised and measured in technical terms, such as kilowatt hours, but additional information, such as the fuel sources and technologies used for generation (the so-called attributes), cannot be so easily measured.

In 2001, Directive 2001/77/EC of the European Parliament and of the Council compelled member states to introduce a system allowing the origin of electricity generated from renewable energy sources to be guaranteed and traced. The directive left the date of introduction to the authorities of the member states. The minimum specifications of a “Guarantee of Origin” are the amount of electricity from renewable sources that has been injected into the public grid, the type of renewable energy source used, the date and place of production, and, in the case of hydroelectric installations, the capacity of the power plant. The Guarantee of Origin provides transparency on some of the technically non-measurable attributes of electricity and therefore helps to distinguish electricity produced from renewable sources from conventional electricity. The Guarantee of Origin is, however, not a label. It is solely designed to stimulate cross border trade in the European market for renewable trading certificates and to increase renewable energy production and competition.

In several countries, such as the US, the EU, Japan and Australia, both mandatory and voluntary systems serve to track the electricity production and promote the standardisation of green electricity certification. The EU has two different systems that provide Guarantee of Origin: Renewable Energy Certificate System (RECS) and European Energy Certificate System (EECS). The fact that there are two systems is due to the historical development of RECS. RECS was originally founded as a non profit organisation on a voluntary basis and

served as a guideline for EECS, which was developed at a later stage as a mandatory scheme based on EU directives and national legislation. The intention is that EECS and RECS become one system in the future.

RECS and EECS in Europe

In 1999, a voluntary association of market players founded RECS. The aim was to harmonise the trading certificates market for electricity from renewable resources by providing a standard and thereby stimulating a pan-European market for renewable electricity. RECS had 200 members in 2007 in more than 24 European countries. It has established common rules to ensure the application of the same standards and processes throughout Europe for the trade of electricity from renewable energy sources. A RECS Certificate has a unique trading certificate number and specifies the name of the certificate’s Issuing Body, the specification of the utility, the time of issue, the underlying technology, the installed capacity and mentions any receipt of public subsidies.

EECS was established in 2005, largely based on RECS. As stated by the Association of Issuing Bodies (AIB), EECS builds an “integrated European framework for issuing, holding, transferring and otherwise processing, electronic records (EECS Certificates) certifying, in relation to specific quantities of energy output, attributes of its energy source or the method and quality of its production.” EECS now supports RECS certificates, Guarantees of Origin for electricity from renewable energy sources (RES-GO), Guarantees of Origin for electricity from cogeneration (CHP) and generic Guarantees of Origin into one coherent certificate system. As all kinds of energy (fossil, nuclear, renewable) can be registered under the EECS, a Renewable Energy Declaration (RED) is needed. If all requirements are met, the production facility will be registered as renewable in the EECS database.

The trading certificates issued for green energy represent all the attributes for a specific unit of energy. Transferal of the trading certificate from one owner (the producer) to another (the reseller) to a third (the consumer), transfers the attributes too. The final owner (normally the consumer) hence knows, based on the trading certificate, the origin of the electricity. As soon as this specific unit of electricity is consumed, the trading certificate is transferred to a redemption account. It should be possible to avoid double accounting with this mechanism.

According to AIB, 15 European countries (including Switzerland and Norway) are now active members of the EECS. Eight of the member countries offer internationally transferrable RES-GO certificates and all offer voluntary RECS certificates. Hence, RES-GO certificates are basically the legislated form of the existing voluntary RECS.

Benefits and issues related to trading certificate markets

Trading certificates can be used as an enabler for many types of support schemes for electricity generated from renewable energy resources, whether voluntary offerings, such as “green energy” or mandatory, such as supply obligations or feed-in systems.

8.2 Detailed explanation of the criteria used for the label analysis

Sustainability Criteria

No.	Title	Details
1	Hydroelectricity: minimum flow regulations	Ensures a discharge regime that closely reflects the natural characteristics of the river system involved (such as preventing any unnatural isolation of fish and invertebrate fauna, guarantee connectivity of river systems and others). For a detailed description see the study “greenhydro”.
2	Hydroelectricity: hydro peaking	The aim here is to prevent negative effects of discharge fluctuations and to concentrate on its moderation (such as to avoid organisms getting stranded). For a detailed description see the study “greenhydro”.
3	Hydroelectricity: reservoir management	Concentrates on the ecological management of large annual storage reservoirs, river impoundments and sand traps. Includes for example the avoidance of sudden flushing. For a detailed description see the study “greenhydro”.
4	Hydroelectricity: bed load management	The aim of ecologically based bed load management is to establish regulations to ensure that the budget of solid materials is geared towards the natural characteristics of the river involved (such as to enable sediment transport, channel re-arrangement and so on). For a detailed description see the study “greenhydro”.
5	Hydroelectricity: power plant design	Deals with the design of the technical installations: The aim is to avoid emitting toxic lubricants, damaging organisms in turbines or mechanically disturbing sediment transport. For a detailed description see the study “greenhydro”.
6	Hydroelectricity: ecological improvement fund	Ecological and sustainable operation of hydroelectric plants is linked to high investments. Is it necessary to establish a fund for ecological improvement measures for the plant’s surroundings? If so, how big are the payments and what are the rules for the use of them?
7	Hydroelectricity: equal treatment of all sizes of power plants	Usually small hydroelectric plants are treated as inherently ecological. This is a misinterpretation as one can only speak of a reduction of environmental impairment compared to a “normal plant”. This criterion looks at whether there is equal treatment of small and large hydroelectric power plants (including special criteria for small plants, threshold value for small plants).
8	Electricity from wind	Evaluates criteria for power generation from wind turbines, such as a guarantee for the protection of landscape and surroundings, minimum level of plant efficiency, definitions of threshold values for maximum global impact of energy system based on LCA, criteria for offshore wind turbines.

No.	Title	Details
9	Electricity from photo-voltaics	Evaluates criteria for power generation from photovoltaics, such as a guarantee for the protection of landscape, considerations of land use aspects, definitions of threshold values for the maximum global life cycle impact of the energy system.
10	Electricity from biomass	Looks at whether a threshold value for maximum global life cycle impact of the energy system is defined. Also considers plant efficiency and criteria for avoiding impairment of the landscape, the reduction of waste gas, smell and noise emissions, reduction of ammoniac emissions, requirements for the use of lighting-up oil and concerning cleaning and filtering systems and treatment of waste water.
11	Electricity from geo-thermal energy and tidal power plants	Evaluates criteria for geothermal energy, such as the definition of threshold values for maximum global life cycle impact of the energy system.
12	Electricity from waste	Only that part of waste originating from biogenic waste should be considered as a renewable energy source. Other criteria concentrate on obligations for plant efficiency, definition of threshold values for maximum global life cycle impact of the energy system, cost-covering operation of waste incineration, provision of information concerning waste separation and recycling.
13	Exclusion of non-renewable electricity	Evaluates if renewable energy sources alone are eligible for certification, such as the exclusion of fossil powered CHP.
14	Quality of support scheme	The label's contribution to increasing the electricity production from renewable energy sources is analysed (and the different schemes are described in the label reports). Criteria for the support scheme are evaluated; these might be the object of the support scheme (new plants or efficiency), quota for building new plants, if calculations concerning the effectiveness of the support schemes exist.
15	No rivalry between electricity generation and food cultivation	Evaluates criteria used by the label to ensure that biomass used for electricity generation does not come from arable land that should be used for food production.
16	Securing of soil fertility and land use	Evaluates criteria regarding soil fertility, sustainable land use, exclusion of genetically modified organisms, obligatory FSC certification for wood and safeguarding of biodiversity.
17	Biomass tracking	Usually the trade in biomass passes through numerous hands. Declaration of the origin of the biomass and tracking systems that record the whole process from production to consumption are evaluated.
18	Social criteria for dam building projects	The WCD Guidelines serve as the standard to analyse the label's criteria. The guidelines require: efforts to gain public acceptance for the dam project, the assessment of alternatives to the dam projects, improvements to existing dams, sustaining rivers and livelihoods, recognising the rights of people involved and sharing the benefits of the dam project with them, ensuring compliance with governmental regulations, respecting trans-boundary issues for rivers and their role for peace, development and security.

No.	Title	Details
19	Corporate social responsibility of electricity producer	Evaluates criteria for social responsibility, such as obligations for an environmental management system, if sustainable provision and efficient use of energy is part of corporate policy, if the enterprise applies the ILO conventions, protection of cultural assets and landscapes or human heritage, improvement of health and safety issues for local population, working conditions, poverty alleviation, improvement of access to essential services and educational offers for local society.
20	Market share	Market share serves as a proxy for economical sustainability as few suitable criteria were available for the labels. Market share = division of “the amount of renewable electricity labelled by a label” with “the total renewable electricity produced in the same country”. The rationale of this criterion is that the basic function of a label is to provide a potential consumer with distinctive information about a product. A label serves as a tool to reduce complexity in a market for every single consumer and therefore lowers the transaction costs. A label with a big market share lowers the transaction costs of many consumers and provides economic value.

Process Criteria

No.	Title	Details
1	Representation of industry	Representation of key players in the electricity market in the responsible labelling body is evaluated. The presence of electricity producers and suppliers is seen to be beneficial.
2	Representation of pressure groups	Representation of electricity market's pressure groups in the responsible labelling body is evaluated. The presence of public authorities, consumer organisations, environmental organisations or social organisations is seen to be beneficial.
3	Guarantee of legal compliance	Evaluates whether the label complies with the requirements for an electricity generator as a prerequisite for labelling eligibility and that the use of the label by suppliers and producers is based on a contract.
4	Audit by independent third party	Evaluates if the label is audited by an independent third party.
5	Periodical revaluation of certification	Evaluates if there is a time limit on the validity of the certification and if there are processes in place for controlling audits and re-certification.
6	Declaration of origin	Evaluates if the electricity can be traced back to the generating plant.
7	Avoidance of double counting	Consumers must be sure that the added value they are paying for is exclusively reserved for them. The processes are evaluated that guarantee that the labelled electricity produced exceeds, or at least is equal to, the labelled electricity sold (such as via a balancing system).
8	Regulation for deficit in supply	Evaluates the rules for a deficit in supply (such as prohibition of deficit in supply, compensation within a certain time period, allowed deficit limited to a certain percentage and so on)
9	Only net energy permitted	Evaluates criteria requiring electricity generators to subtract their own electricity consumption and losses at the generation plant from the amount of certified electricity, such as by subtracting pumping electricity.

Nr	Title	Details
10	LCA verification	Evaluates if the label requires calculations based on LCA that define maximum eligible threshold values for the global impact of the energy systems (such as the Eco Indicator 99).
11	Availability of information on electricity quality	Evaluates criteria concerning the obligation to inform consumers, such as if the origin of the electricity is communicated to the end consumer, if the consumer can choose between electricity of different origin, if the consumer receives information on the added value of the certified electricity and an annual report.
12	Communication and availability of criteria	Evaluates if the label's criteria are publicly available (for example on the web site).
13	Protection of consumer rights	Evaluates the guarantee of availability for the contracted electricity, terms of cancellation for the supply contract between supplier and customer and obligation of the electricity supplier to communicate about the use of the logos and wording of agreements.

8.3 Definitions

Additionality

Additionality in this survey refers to the sustainable quality that goes further than the national electricity market's legal framework, the so-called baseline (such as more water or landscape protection, or avoidance of competing with food production). Many labels claim that their support schemes (see definition "support scheme") increase the percentage of electricity from renewable energy sources in their respective national production grid. Also in many countries systems of subsidies exist to support additionality beyond the mandatory framework. It has to be ascertained that there is no double sponsorship from labels and subsidies for the same product, as this would mean no additional effect would be achieved for the additional charge.

Baseline

Legal compliance with the regulations of a country, see also definition of additionality.

Carbon footprint

The total set of greenhouse gas emissions caused directly and indirectly by an individual, organisation, event or product expressed as CO₂ equivalent.

Certification

Certification means the granting of a mark according to certain criteria. The survey uses this term only in the context of the labelling of electricity according to the Type I label (see definition "label").

CO₂ (emissions)

Carbon dioxide (CO₂) is a colourless, odourless and non-poisonous gas formed by combustion of carbon and by respiration in living organisms and is considered a greenhouse gas. Emissions means the release of greenhouse gases or their precursors into the atmosphere over a specified area and period of time

Conversion factor

Greenhouse gas conversion factors are used to determine the carbon dioxide emissions caused by the use of energy. In order to convert energy consumed in kWh to kg of carbon dioxide, energy use has to be multiplied by a conversion factor.

Criteria

Statement of needs, rules, standards or tests that must be used in evaluating a decision, idea, opportunity, programme or project to form a correct judgment regarding the intended goal.

This survey uses the term “criteria” for such rules or standards that assess sustainability (ecological, social and economical) and procedural aspects.

Declaration system

A declaration system declares the electricity mix (by energy sources) to the end consumer.

EECS – The European Energy Certificate System

European Energy Certificate System EECS is a European trading system for energy based on energy certificates which are traded in the participating countries. See appendix 8.1 for further details.

Green electricity

Electricity generated from renewable sources, whose superior ecological status is founded on the fulfilment of several criteria on local, regional and global level. The ecological added value of green electricity is balanced by a Life Cycle Assessment and linked to a certain limit. In this report however, green electricity is understood as renewable electricity.

Greenhouse gas (GHG)

GHGs are gaseous constituents of the atmosphere that absorb and emit radiation at specific wavelengths emitted by the Earth's surface, the atmosphere itself, and by clouds. There are many different gases in the Earth's atmosphere, one of them being carbon dioxide (CO₂). Moreover, there are also a number of entirely human-made greenhouse gases in the atmosphere.

Guarantee of Origin

See definition “tracking system”.

Label

Only labels fulfilling the criteria of the ISO requirements for “Environmental labels or eco-labelling” (Type I) were accepted as labels in this survey (for the sake of completeness, all types are mentioned).

Type I, Environmental labels or eco-labels: The international organisation for standardization (ISO) defines three different standards for environmental labelling: ISO 14020, ISO14021, ISO 14024. Environmental labels or eco-labels are defined as “voluntary systems operated by a third party organisation, which allows the use of a specific environmental label on products (such as electricity products) that comply with certain ecological criteria”. The labelling body must be a third party, meaning a person or body that is recognised as being independent of the supplier (“first party”) and purchaser (“second party”) interests. The labelling body establishes environmental criteria assessing the environmental performance of the product during its life cycle. The aim is to differentiate environmentally sound products from others in the same product category, based on a measurable difference in the environmental impact. It is important that environmental labels should demonstrate transparency through all stages in order to achieve credibility among the consumers.

Type II, Environmental claims: An environmental claim is a statement or a symbol that indicates an environmental aspect of the product (such as green electricity, eco-electricity or even 100% hydropower) commonly used to indicate less environmental impact than a standard product. In the case of electricity, such products are usually production-declared electricity, such as wind or hydropower, commonly marketed under a brand. In most countries, there is no specific law concerning environmental claims on electricity products. However, the legal restrictions are specified in national marketing laws which usually comply with the guidelines issued by the International Chamber of Commerce (ICC).

Type III, Environmental product declaration: Similar to labels, Environmental Declarations (ED) provide standardised information about the environmental impact of a product; however, the actual assessment of the product is left to the consumer.

Life Cycle Assessment (LCA)

An LCA is the investigation and evaluation of the environmental impacts of a product or service caused or necessitated by its existence to compare the full range of environmental and social disadvantages assignable so as to be able to choose the most innocuous one. The procedures of LCA are part of the ISO 14000 environmental management standards.

REC

In this report, a REC represents a certificate of one megawatt-hour (MWh) of electricity generated from renewable energy resource. There is no further ecological quality in a REC other than that it originates from a renewable source.

RECS

The Renewable Energy Certificate System (RECS) is a European trading system for energy issued from renewable sources based on energy certificates which are traded in the participating countries. See appendix 8.3 for more details.

Renewable electricity

Included in the definition of renewable energy is electricity generated from solar, wind, ocean, hydropower, biomass or geothermal resources and biofuels and hydrogen derived from renewable resources.

Renewable energy

Renewable energy is derived from natural processes that are replenished constantly. The energy sources are naturally replenishing but flow limited. They are virtually inexhaustible but limited in the amount of energy that is available per unit of time.

Sustainability

There exist hundreds of definitions for sustainability; well-known is the Brundtland Commission's definition that describes sustainability as forms of progress that meet the needs of the present without compromising the ability of future generations to meet their needs.

Support schemes

Label support schemes are mechanisms to promote certain aspects of supply, such as additional kWh electricity issuing from renewables or additional ecological performance.

Tracking system

Tracking systems declare and track the origin of each kWh of electricity and the corresponding energy source. One example of a tracking system is the Guarantees of Origin (GoO) system: GoO were introduced by two European Directives: for RES-E, the GoO is defined in Directive 2001/77/EC, Art. 5, and for high efficiency cogeneration in Directive 2004/8/EC, Art. 5. These GoO shall enable producers of electricity from renewable energy sources or from high efficiency cogeneration to demonstrate that their electricity is produced from the respective sources or technologies within the meaning of the directives. The GoO as defined by these directives are issued on request only and therefore will most likely cover only part of the respective markets. Because the directives do not specify the instruments of the GoO in much detail, the implementation of GoO in member states and their potential application shows significant variations.

Trading system

Trading systems are database systems which allow merchandising electricity. In Europe, the Renewable Energy Certification System RECS is a well known trading system.

8.4 Abbreviations

Abbreviations	
AEE	Agentur für erneuerbare Energien und Energieeffizienz (Switzerland)
AIB	Association of Issuing Bodies
ANEEL	Agência Nacional de Energia Elétrica / Electricity Regulatory Agency (Brazil)
ASEAN	Association of Southeast Asian Nations
ASTEA	Asia Alternative Energy Programme
BRUGEL	Brussels capital region (Belgium)
CCA	Climate Change Agreements (UK)
CCL	Climate Change Levy (UK)
CCS	Carbon capture and storage
CDM	Clean Development Mechanism
CDP	Capability Development Programme (Singapore)
CER	Commission for Energy Regulation (Ireland)
CHP	Combined Heat and Power
CNE	National Energy Regulation (Spain)
COP	Conference of the parties
CRC	Carbon Reduction Commitment (UK)
CREG	Commissie voor de Regulering van de Electriciteit en het Gas / Commission de Régulation de l'Electricité et du Gaz (Belgium)
CRS	Centre for Resource Solutions
CSR	Corporate Social Responsibility
CWaPE	Walloon Region (Belgium)
DECC	Department of Energy and Climate Change (UK)
DEFRA	Department for Environment, Food and Rural Affairs (UK)
DME	Department of Minerals and Energy (South Africa)
EDB	Economic Development Board (Singapore)

EDF	Electricité de France
EEA	European Environment Agency
EECS	European Energy Certificate System
EECS-GO	European Energy Certificate System Guarantee of Origin
EMA	Energy Market Authority (Singapore)
EPA	Environmental Protection Agency (US)
ERCOT	Electric Reliability Council of Texas (US)
ERLDC	Eastern Regional Load Despatch Centre (India)
ETS	Emission Trading System
EU	European Union
EUGENE	European Green Electricity Network
EVE	Electricité Verte (France)
GATS	General Agreement on Trade in Services
GEN	Global Ecolabelling Network
GENICES	Programme of Global Ecolabelling Network
GHG	Greenhouse gas(es)
GO / GoO	Guarantees of Origin
GPCCJ	Green Power Certification Council
GRI	Global Reporting Initiative
GWh	Gigawatt Hour
IEA	International Energy Agency
IIF	Innovation Investment Fund (Australia)
IPCC	Panel on Climate Change
ISSET	Institut für Solare Energieversorgungstechnologie
ISO	International Standardization Organisation
JI	Joint Implementation
JNEC	Japan Natural Company Ltd (Japan)
kWh	Kilowatt Hour
KWKG	Kräfte-Wärme Kopplungsgesetz (Germany)
LCA	Life Cycle Assessment

Abbreviations	
LEC	Levy Exemption Certificate (UK)
LSPEE	Ley del Servicio Público de Energía Eléctrica / Electric Energy Public Service Law (Mexico)
M-RETS	Mandatory Renewable Energy Target (Australia)
MWh	Megawatt Hour
NEPOOL	New England Power Pool (US)
NERSA	National Energy Regulator (South Africa)
NOLCO	Net-operation loss carry-over (Philippines)
NRLDC	Natural Resources Defence Council (India)
NSW	New South Wales (Australia)
OAU	Organisation of African Unity
OEB	Ontario Energy Board (Canada)
OECD	Organisation for Economic Co-operation and Development
OEMAG	Renewable Energy Operation Company (Austria)
OFGEM	Electricity and gas markets regulation (UK)
ONS	Operador Nacional do Sistema Elétrico / National Electric System Operator (Brazil)
PC	Procedure criteria
POPE	Programme fixant les orientations de la politique énergétique / Guidelines for Energy Policy (France)
PROFINA	Programa de Incentivo a Fontes Alternativas de Energia Elétrica / Programme of Incentives for Alternative Electricity Sources (Brazil)
PSO	Public Service Obligation (Denmark)
PTC	Power Trading Corporation (India)
PTC	Renewable Electricity Production Tax Credit (US)
PwC	PricewaterhouseCoopers

RDF	Refuse-derived fuel
REC	Renewable Energy Certification
RECS	Renewable Energy Certification System
RED	Renewable Energy Declaration
REEF	Renewable Energy Equity Fund (Australia)
REEF Onlus	Re-energy foundation Onlus (Italy)
REFIT	Renewable Energy Feed in Tariff
REGO	Renewable Energy Guarantee of Origin
REM	Renewable Energy Market
REN21	Renewable Energy Network for the 21st Century
REPI	Renewable Energy Production Incentive (US)
RES	Renewable Energy Standard (US)
RES-GO	Renewable Energy Source Guarantee of Origin
RGGI / ReGGIe	The Regional Greenhouse Gas Initiative (US)
ROC	Renewable Obligation Certificates (UK)
RPS	Renewable Portfolio Standard
SC	Sustainability criteria
SEN	Sistema Electricita Nacional (Mexico / Portugal)
SGU	Small Generation Unit
SNET	Société Nationale d'Électricité et de Thermique (France)
SPRING	Standards, Productivity and Innovation Board (Singapore)
SQS	Swiss Association for Quality and Management Systems / Schweizerische Vereinigung für Qualität (Switzerland)
SRDLC	South Regional Load Despatch Center (India)
SWH	Solar Water Heater
SwissTS	Services in safety and environmental technology (Switzerland)

Abbreviations	
TGE	Towarowa Gielda Energii / Power Exchange (Poland)
TPTCL	Tata Power Trading Company Ltd (India)
TRC	Tradable Renewable Certificates
TSO	Transmission System Operator (Hungary / Poland)
UK	United Kingdom
UNASUR	Unión de Naciones Suramericanas / Union of South American Nations
UNDP	United Nations Development Program
US	United States
USDA	United States Department of Agriculture
VUE	Verein für umweltgerechte Energie
WBCSD	World Business Council for Sustainable Development
WREGIS	Western Renewable Energy Generation Information System
WRLDC	Western Regional Load Despatch Center (India)
WEO	World Energy Outlook
WREGISI	The Western Renewable Energy Generation Information System
WRLDC	Western Regional Load Despatch Center (India)
WRI	World Resource Institute
WWF	World Wildlife Fund

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9 Acknowledgements

PwC would like to thank all participants who took time to complete the survey.

PwC Switzerland would like to thank our local PricewaterhouseCoopers teams, in each of the regions covered by this study, for their insightful contributions throughout this project as well as our Global Energy & Utilities Team for their support and guidance in finding valuable information.

PricewaterhouseCoopers would also like to thank WWF Switzerland for its project support as well as VUE for its technical input.

PricewaterhouseCoopers also appreciates the support given to the project by AXA, Bank Sarasin, Credit Suisse, Fortis, Man Group plc., Tetra Pak, Swiss Re and UBS.

PricewaterhouseCoopers is also grateful to the steering group for their periodical critical view and review of documents, working papers and draft reports. The steering group consisted of Veit Bürger, Ökoinstitut Freiburg; Eric Bush, Schweizerische Agentur für Energieeffizienz; Gerhard Emch, Finance and Services ewz; Niels Jungbluth, ESU Services; Anja Kollmuss, Stockholm Environmental Institute US; Wibke Tritthart, Interuniversity Center for Technology, Work and Culture IFZ and Verbraucherzentrale Bundesverband.

10 Contacts

For more information on PwC, refer to www.pwc.com and www.pwc.com/sustainability. For inquiries, please contact the respective Sustainability Practice territory leader or write an e-mail to renewable.electricity@ch.pwc.com.

Global Leader	Argentina	Australia	Austria
Thomas Scheiwiller	Marcelo Iezzi	Liza Maimone	Philipp Gaggl
Phone: +41 58 792 2810	Phone: +54 11 4850 6827	Phone: +61 3 8603 4150	Phone: +43 1 501 88 2834
thomas.scheiwiller@ch.pwc.com	marcelo.iezzi@ar.pwc.com	liza.maimone@au.pwc.com	philipp.gaggl@at.pwc.com
Belgium	Brazil	Bulgaria	Canada
Marc Daelman	Rogério Gollo	Albena Markova	Mike Harris
Phone: +32 2 7107 159	Phone: +55 11 3674 3851	Phone: +35 92 935 5200	Phone: +1 416 941 8256
marc.daelman@be.pwc.com	rogerio.gollo@br.pwc.com	albena.markova@bg.pwc.com	mike.harris@ca.pwc.com
Central America	Chile	China	Costa Rica
Emilia Amado	Luis Perera	Ruth Dobson	Vanesa Gomez
Phone: +506 224 1555	Phone: +56 2 940 0008	Phone: +86 10 6533 2011	Phone: +506 224 1555
emilia.amado@cr.pwc.com	luis.perera@cl.pwc.com	ruth.dobson@cn.pwc.com	vanesa.gomez@cr.pwc.com
Denmark	East Africa	Estonia	Finland
Birgitte Mogensen	Nancy Asiko Onyango	Teet Tender	Sirpa Juutinen
Phone: +45 3945 9276	Phone: +25 420 285 5476	Phone: +372 614 1800	Phone: +35 89 2280 1815
birgitte.mogensen@dk.pwc.com	nancy.asiko.onyango@ke.pwc.com	teet.tender@ee.pwc.com	sirpa.juutinen@fi.pwc.com
France	France	Francophone Africa	Germany
Sylvain Lambert	Thierry Raes	Edouard Messou	Stefan Calvi
Phone: +33 1 5657 8083	Phone: +33 1 5657 8237	Phone: +225 2031 5412	Phone: +49 69 7431 2112
sylvain.lambert@fr.pwc.com	thierry.raes@fr.pwc.com	edouard.messou@ci.pwc.com	stefan.calvi@de.pwc.com
Germany	Greece	Hungary	India
Michael Werner	Harry Kyriazis	Zoltan Varkonyi	Bharti Gupta Ramola
Phone: +49 69 9585 5247	Phone: +30 210 6874 503	Phone: +36 1 461 9177	Phone: +91 244 620 503
michael.werner@de.pwc.com	harry.kyriazis@gr.pwc.com	zoltan.varkonyi@hu.pwc.com	bharti.gupta.ramola@in.pwc.com
Ireland	Israel	Italy	Japan
Robin Menzies	Heelee Kriesler	Paolo Bersani	Takuei Maruyama
Phone: +353 1 704 8553	Phone: +972 3 7954808	Phone: +39 011 5567773	Phone : +81 3 5532 3023
robin.menzies@ie.pwc.com	heelee.kriesler@il.pwc.com	paolo.bersani@it.pwc.com	takuei.maruyama@jp.pwc.com

Luxembourg	Malaysia	Mexico	The Netherlands
Nicolas Erodiades	Mohammad Faiz Azmi	Enrique Bertran	Klaas van den Berg
Phone: +352 49 4848 4138	Phone: +60 3 2693 1077	Phone: +52 55 5263 8692	Phone: +31 30 219 4683
nicolas.erodiades@lu.pwc.com	mohammad.faiz.azmi@my.pwc.com	enrique.bertran@mx.pwc.com	klaas.van.den.berg@nl.pwc.com
New Zealand	Norway	Philippines	Poland
Julia Hoare	Pål Brun	Rose S. Javier	Irena Pichola
Phone: +64 9 355 8593	Phone: +47 95 26 01 45	Phone: +63 2 459 3016	Phone: +48 50 218 4587
julia.hoare@nz.pwc.com	pal.brun@no.pwc.com	rose.s.javier@ph.pwc.com	irena.pichola@pl.pwc.com
Portugal	Romania	Russia	Singapore
Antonio Correia	Emilian Radu	John Wilkinson	Andreas Wettstein
Phone: +351 225 433 114	Phone: +40 21 202 8610	Phone: +7 495 967 6187	Phone: +65 6236 3064
antonio.correia@pt.pwc.com	emilian.radu@ro.pwc.com	john.d.wilkinson@ru.pwc.com	andreas.e.wettstein@sg.pwc.com
South Africa	South Korea	Spain	Sweden
Alison Ramsden	Joonki Min	Maria Luz Castilla Porquet	Lars-Olle Larsson
Phone: +27 11 797 4658	Phone: +82 2 709 0884	Phone: +34 93 253 7005	Phone: +46 709 29 28 13
alison.ramsden@za.pwc.com	joonki.min@kr.pwc.com	maria.luz.castilla.porquet@es.pwc.com	lars-olle.larsson@se.pwc.com
Sweden	Switzerland	Turkey	United Kingdom
Martin Gavelius	Markus Noethiger	Serkan Tarmur	Malcolm Preston
Phone: +46 8 555 335 29	Phone: +41 58 792 2734	Phone: +90 212 326 6216	Phone: +44 207 213 2502
martin.gavelius@se.pwc.com	markus.noethiger@ch.pwc.com	serkan.tarmur@tr.pwc.com	malcolm.h.preston@uk.pwc.com
United States	West Africa		
Helle Bank Jorgensen	Daniel Asapokhai		
Phone: +45 2 331 02 19	Phone: +23 41 320 3201		
helle.bank.jorgensen@dk.pwc.com	daniel.asapokhai@ng.pwc.com		



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