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Proposal for a

DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

on the promotion of the use of energy from renewable sources

(presented by the Commission)

{COM(2008) 30 final}

{SEC(2008) 57}

{SEC(2008) 85}

Explanatory memorandum

1. CONTEXT OF THE PROPOSAL

• **Grounds for and objectives of the proposal**

The Community has long recognised the need to further promote renewable energy given that its exploitation contributes to climate change mitigation through the reduction of greenhouse gas emissions, sustainable development, security of supply and the development of a knowledge based industry creating jobs, economic growth, competitiveness and regional and rural development.

This Proposal for a Directive aims to establish an overall binding target of a 20% share of renewable energy sources in energy consumption and a 10% binding minimum target for biofuels in transport to be achieved by each Member State, as well as binding national targets by 2020 in line with the overall EU target of 20%.

Responding to the call made by the European Council of March 2006 (Council Document 7775/1/06 REV10) the Commission presented its Strategic European Energy Review on the 10 January 2007. As part of the Review, the Renewable Energy Road Map [COM(2006) 848] set out a long term vision for renewable energy sources in the EU. It proposed that the EU establish a binding target of 20% for renewable energy's share of energy consumption in the EU by 2020, and a binding 10% target for the share of renewable energy in transport petrol and diesel.

The European Parliament noted in its Resolution on climate change (14 February 2007) that energy policy is a crucial element of the EU global strategy on climate change, in which renewable energy sources and energy efficient technologies play an important role. The Parliament supported the proposal of a binding target to increase the level of renewable energy in the EU energy mix to 20% by 2020 as a good starting point, and considered that this target should be increased to 25% of the EU energy mix. Furthermore the European Parliament, in its Resolution on the Roadmap for Renewable Energy in Europe (25 September 2007), called on the Commission to present by the end of 2007 a proposal for a renewable energy legislative framework, referring to the importance of setting targets for the shares of renewable energy sources at EU and Member State level.

The Brussels European Council of March 2007 (Council Document 7224/07) reaffirmed the Community's long-term commitment to the EU-wide development of renewable energies beyond 2010 and invited the Commission to submit its proposal for a new comprehensive Directive on the use of renewable resources. This should include legally binding targets for the overall share of renewable energy and the share of biofuels for transport in each Member State.

• **General context**

The EU and the world are at a cross-road concerning the future of energy. The challenges of climate change caused by anthropogenic emissions of greenhouse gases, mainly from use of fossil energy, need to be tackled effectively and urgently. Recent studies have contributed to growing awareness and knowledge of the problem and its long-term consequences, and have stressed the need for decisive and immediate action. An integrated approach to climate and

energy policy is needed given that energy production and use are primary sources for greenhouse gas emissions. The European Union's increasing dependence on energy imports threatens its security of supply and implies higher prices. In contrast, boosting investment in energy efficiency, renewable energy and new technologies has wide-reaching benefits and contributes to the EU's strategy for growth and jobs.

The consequences of climate change, increasing dependence on fossil fuels, and rising energy prices make it even more pressing for the EU to put in place a comprehensive and ambitious policy on energy combining action at the European and Member States' level. In the framework of this energy policy, the renewable energy sector stands out for its ability to reduce greenhouse gas emissions and pollution, exploit local and decentralised energy sources, and stimulate world-class high-tech industries.

Renewable energy sources are largely indigenous, they do not rely on the future availability of conventional sources of energy, and their predominantly decentralised nature makes our economies less vulnerable to volatile energy supply. Consequently they constitute a key element of a sustainable energy future.

For renewables to become the "stepping stone" to reaching the dual objective of increased security of supply and reduced greenhouse gas emissions, a change in the way in which the EU promotes renewables is needed. Strengthening and expansion of the current EU regulatory framework is necessary. It is important to ensure that all Member States take the necessary measures to increase the share of renewables in their energy mix.

A new legislative framework for the promotion and the use of renewable energy in the European Union will provide the business community with the long term stability it needs to make rational investment decisions in the renewable energy sector so as to put the European Union on track towards a cleaner, more secure and more competitive energy future.

- **Existing provisions in the area of the proposal**

Directive 2001/77/EC (OJ L 283, 27.10.2001) of the European Parliament and of the Council on the promotion of electricity produced from renewable energy sources in the internal market: the Directive sets a 21% indicative share of electricity produced from renewable energy sources in total Community electricity consumption by 2010. It defines national indicative targets for each Member State, encourages the use of national support schemes, the elimination of administrative barriers and grid system integration, and lays down the obligation to issue renewable energy producers with guarantees of origin if they request them. With current policies and efforts in place, it can be expected that a share of 19% by 2010 – rather than the 21% aimed at - will be reached.

Directive 2003/30/EC (OJ L 123, 17.5.2003) of the European Parliament and of the Council on the promotion of the use of biofuels or other renewable fuels for transport: the Directive sets a target of 5.75% of biofuels of all petrol and diesel for transport placed on the market by 31 December 2010. Member States were required to set indicative targets for 2005, taking a reference value of 2% into account. This interim indicative target has not been achieved. Biofuels counted to 1% of transport fuel in 2005. The Commission's conclusion according to the assessment of the progress is that the target for 2010 is not likely to be achieved- expectations are for a share of about 4.2%.

Provisions of the former 2001/77/EC and 2003/30/EC Directives that overlap with the provisions of the new Directive will be deleted at the moment of transposition; those that deal with targets and reporting for 2010 will remain in force until 31 December 2011.

- **Consistency with the other policies and objectives of the Union**

The Proposal is consistent with the EU policies of combating climate change, reducing greenhouse gas emissions, achieving sustainable development, ensuring energy security and realising the Lisbon Strategy.

The proposal will, in particular, form part of a legislative package that will establish greenhouse gas and renewable energy commitments for all Member States. In addition to the present Directive establishing renewable energy targets for 2020, the package proposed by the Commission includes a Regulation updating national greenhouse gas emissions targets and a Directive to improve and expand the EU emissions trading system (EU ETS). The interlinkages between setting greenhouse gas reduction targets, the emissions trading scheme and renewable energy targets are clear. The Commission sees the various elements as complementary: EU ETS will facilitate growth in renewable energy; the renewable energy Directive will create conditions enabling renewable energy to play a key role in reaching the greenhouse gas reduction targets.

The Community's external energy policy should ensure the common voice of the EU in support of intensifying its relationship with its energy partners, with a view to further diversifying sources and routes, strengthening partnership and cooperation and focusing on the reduction of greenhouse gas emissions, renewables and increasing energy efficiency. Third countries should be able to benefit from the promotion of renewables in the EU through the supply of biofuels and other bioliquids which meet sustainability requirements, or the supply of renewable electricity from neighbouring countries. While in principle, no trade restrictions should apply to renewable energy imports or exports, the Community must ensure that a level playing field is afforded to all renewable energy producers, in and outside of the Community. As this proposal sets ambitious objectives for Member States and its industry to meet, the issue of legal framework of third countries must be addressed.

The development of a market for renewable energy sources and technologies also has a clear positive impact on security of energy supply, regional and local development opportunities, rural development, export prospects, social cohesion and employment opportunities, especially as concerns small and medium-sized undertakings as well as independent power producers.

The proposal is also consistent with the European Strategic Energy Technology Plan [COM(2007) 723], which emphasises the need to bring the next generation of renewable energy technologies to market competitiveness. In addition, information and communication technologies will further facilitate the integration of renewable energies into the European electricity supply and distribution system.

2. CONSULTATION OF INTERESTED PARTIES AND IMPACT ASSESSMENT

• Consultation of interested parties

Consultation methods, main sectors targeted and general profile of respondents

The main issues addressed in the renewable energy roadmap were debated in the public consultation on the Energy Green Paper and the Strategic European Energy Review between March and September 2006. Furthermore there have been consultations during 2007 including with Member States, citizens, stakeholder groups, civil society organisations, NGOs and consumer organisations.

The legislative proposal is based on a thorough impact assessment process with widespread consultation with stakeholders: numerous meetings with stakeholders on the key issues of the proposal, including barriers to the development of renewable energy uses, biofuels sustainability and flexibility measures in meeting the renewable national targets. Four public consultation exercises (Internet) have taken place, apart from the one on the Energy Green Paper (March-September 2006), on the revision of biofuels policy, on heating and cooling in renewable energy, on administrative barriers and on biofuels sustainability.

1. Public consultation on the biofuels Directive review (April-July 2006);
2. Public consultation on the promotion of heating and cooling from renewable energies (August-October 2006);
3. Public consultation on administrative barriers to the development of renewable resources in the electricity sector (March-April 2007);
4. Public consultation on biofuel issues in the new legislation on the promotion of renewable energy (April-June 2007).

Summary of responses and how they have been taken into account

There was wide support for a stronger policy on renewable energy sources and notably to a longer-term target for renewable energy, with suggestions ranging from 20% in 2020 to 50% and more by 2040/2050. The use of obligatory targets was widely supported, as was the internalisation of external costs.

The main positive effects of an EU initiative to increase heating and cooling from renewable energy sources, as suggested by a large number of respondents, are related to the promotion of local employment and opportunities for small and medium sized enterprises, regional and rural development, stimulating economic growth and increasing global European industry leadership. Tackling climate change and the security of the EU's energy supply were also seen as positive effects. The negative effects suggested by respondents mostly relate to the pressure on biomass resources, which are also used for non-energy industrial use and its further exploitation may lead to shortages or undesirable environmental impacts.

The biofuels issues in the Directive were the subject of the last related public consultation exercise. The proposal submitted to consultation proposed three sustainability criteria: a) land with high carbon stocks should not be converted for biofuel production; b) land with high biodiversity should not be converted for biofuel production; c) biofuels should achieve a

minimum level of greenhouse gas savings (carbon stock losses from land use change would not be included in the calculation). In the responses, there is general support for such criteria from most respondents, with many proposing further reinforcements to the scheme.

- **Collection and use of expertise**

Scientific/expertise domains concerned

In order to answer the question whether the EU should adopt quantified targets for the share of renewable energy in 2020 and if so, for what amount and what form, several analyses and studies have been realised including the contribution of external experts.

Methodology used

For the modelling exercise various scenarios using the PRIMES and Green-X models have been carried out for the EU-27.

Main organisations/experts consulted

Several studies have been carried out and used in order to define the different elements of the proposal. These include the FORRES 2020 report: "Analysis of the EU renewable energy sources' evolution up to 2020, April 2005"; the OPTRES report: "Analysis of barriers for the development of electricity generation from renewable energy sources in the EU-25", May 2006; the RE-GO project "Renewable Energy Guarantees of Origin: implementation, interaction and utilization", European Commission Contract No 4.1030/C/02-025/2002; the E-TRACK project "A European Standard for the tracking of electricity", European Commission Contract No EIE/04/141/S07.38594; the PROGRESS project "Promotion and growth of renewable energy sources and systems", European Commission Contract No TREN/D1/42-2005/S07.56988; and the report by MVV Consulting, June 2007: "Heating and cooling from renewable energies: cost of national policies and administrative barriers". Regarding biofuels target impact on food prices, the study carried out by the Zentrum für Europäische Wirtschaftsforschung (ZEW) (2007): "Competitiveness effects of trading emissions and fostering technologies to meet the EU Kyoto targets", 2007.

Means used to make the expert advice publicly available

Most of the studies used have been published or are available on the Europa website, including the OPTRES project with contract No.: EIE/04/073/S07.38567 (www.optres.fhg.de) Progress report, 2007 "Identification of administrative and grid barriers to the promotion of electricity from Renewable Energy Sources" published at: http://ec.europa.eu/energy/res/consultation/admin_barriers_en.htm.

The MVV Consulting report on "Heating and cooling from renewable energies: cost of national policies and administrative barriers" is available at: http://ec.europa.eu/energy/res/sectors/heat_from_res_en.htm.

- **Impact assessment**

The impact assessment explores the associated options, described below:

- In what units should renewable energy targets be expressed? The impact assessment compares options for expressing the targets in terms of primary or final energy

consumption and concludes in favour of the latter, as it does not discriminate between different types of renewable energy and accounting in primary energy gives greater weight to thermal and nuclear energy and therefore increases in these energy sources would make the achievement of any given renewable energy share harder to achieve.

- How should the 20% commitment be shared between Member States? Different methods are assessed, including modelled resource potential in each Member State, applying a flat-rate increase for all Member States, and modulating results by GDP to reflect fairness and cohesion. The conclusion is that a flat-rate approach modulated by GDP is the most appropriate as it provides a simple common, fair increase for all Member States. When weighted by GDP, the result reflects the wealth of the different Member States, and when modulated to take account of early progress in developing renewables, the result recognises the role "early starters" have played in leading the development of renewable energy in Europe and also reflects an overall cap on the targeted share of renewable energy in 2020 in individual Member States.
- How can cross border transfers in renewables be improved (through the use of guarantees of origin) to help Member States achieve their commitments – including the possibility of renewable energy consumed in one Member State counting towards the targets of another? Options of standardising the guarantees of origin already applied in the electricity sector are examined together with the possible expansion of scope beyond the electricity sector and various degrees of transferability of guarantees of origin. It is suggested that the guarantee of origin regime can be substantially improved and standardised and that its scope could be extended to large scale heating and cooling.
- What administrative and market barriers to the development of renewable energy can be removed? A range of planning rules, administrative procedures and market information failures are examined and requirements or recommendations to remove them are proposed (such as creating "one-stop-shops", ensuring charges are proportionate, granting mutual recognition of certification, setting planning deadlines, greater provision of information to public and professionals, and establishing minimum levels of renewable energy consumption in new buildings).
- What criteria and monitoring methods can be used to form a biofuels sustainability regime? A wide range of options are explored, and it is suggested that such a system should include minimum levels of greenhouse gas performance, criteria on biodiversity and rewards for the use of feedstock diversifying the raw material pool such as lignocellulosic material for the production of second generation biofuels. It is appropriate to leave verification to Member States (whilst encouraging multinational certification schemes); the penalty regime for failing to meet the criteria should be consistent across the single market and include exclusion from tax breaks, the barring of such biofuels from biofuel obligations and national targets. Finally, the actual "tracing" of the biofuels will require physical tracking, so that biofuels fulfilling the sustainability criteria can be identified and rewarded with a premium in the market.

3. LEGAL ELEMENTS OF THE PROPOSAL

- **Summary of the proposed action**

The proposed Directive lays down the principles according to which Member States need to ensure that the share of renewable energy in the EU final energy consumption reaches at least 20% by 2020, and establishes national overall targets for each Member State.

Three sectors are concerned in renewable energy: electricity, heating and cooling and transport. The overall approach is for Member States to retain discretion as to the mix of these sectors in reaching their national target. However, it is proposed that each Member State shall achieve at least a 10% share of renewable energy (primarily biofuels) in the transport sector by 2020. This is done for the following reasons: (1) the transport sector is the sector presenting the most rapid increase in greenhouse gas emissions of all sectors of the economy; (2) biofuels tackle the oil dependence of the transport sector, which is one of the most serious problems of insecurity in energy supply that the EU faces; (3) biofuels are currently more expensive to produce than other forms of renewable energy, which might mean that they would hardly be developed without a specific requirement.

Specifically for biofuels and other bioliquids, the Directive sets up a system to guarantee the environmental sustainability of the policy, ensuring *inter alia* that the biofuels counting towards the targets achieve a minimum level of greenhouse gas savings.

- **Legal basis**

The Proposal will be made on the basis of Article 175(1) of the Treaty in combination with Article 95. While a single legal base is preferred, it is recognised that a dual legal base is appropriate where a measure contains provisions based on different parts of the Treaty. Both these legal bases imply the use of the co-decision procedure.

The majority of the Proposal falls under Article 175(1) (environment). This Article gives the Community power to act to preserve, protect and improve the quality of the environment, protect human health and make prudent and rational use of natural resources. These objectives are pursued by this Directive.

However, Articles 15, 16 and 17 of the Proposal impose binding obligations on Member States regarding the sustainability of biofuels and other bioliquids. While the sustainability criteria themselves obviously pursue an aim of environmental protection, the Directive also prevents Member States from adopting certain measures which would obstruct trade in biofuels or raw materials. The Directive thus aims for a complete harmonisation of biofuel sustainability criteria in order to ensure that no criteria adopted individually by Member States may constitute an obstacle to trade between Member States. For this element of the Directive, the internal market is therefore considered to be the primary objective. This assessment is not altered by the fact that environmental protection is also an important goal, since Article 95(3) EC expressly provides for a high level of protection of the environment to be aimed for in measures to complete the internal market. The Commission therefore considers that the provisions of harmonised standards for biofuel sustainability fall under Article 95 (internal market).

In general, renewable energy is a close substitute for conventional energy and is supplied through the same infrastructure and logistic systems. All Member States already use

renewable energy and all have already decided to increase renewable energy's share. For these reasons, the proposal will not significantly affect Member States' choice between different energy sources or the general structure of their energy supply and does not fall under Article 175(2) of the Treaty.

- **Subsidiarity principle**

The subsidiarity principle applies insofar as the Proposal does not fall under the exclusive competence of the Community.

The objectives of the Proposal cannot be sufficiently achieved by the Member States for the following reasons:

It is clear from the experience with the promotion of renewable energy sources in the European Union that real progress only began to be made when the European Union adopted legislative instruments containing targets to be reached by a given deadline. This is true for Directive 2001/77/EC on the promotion of electricity from renewable energy sources and for Directive 2003/30/EC on the promotion of the use of biofuels. No such legal framework exists to promote the penetration of renewable energy sources in the heating and cooling sector. The development of renewable energy in this sector is nearly stagnant.

The European Council has concluded that the European Union needs to collectively achieve a 20% share of renewable energy sources in final energy consumption by 2020 for reasons of security of supply, of environmental protection and for reasons of competitiveness of the renewable sector, which is currently a world leader in many sectors.

Leaving action to the Member States would put the achievement of this share at risk and would not realise an equitable distribution of the efforts needed to arrive at the 20% overall share. In addition, leaving action completely to the Member States would also create investor uncertainty as to the objectives to be reached and the pathway toward these objectives.

In addition to the targets, the Directive addresses means to support the development of renewable energy, such as administrative procedures, planning, construction and information and training. For electricity from renewable energy sources it tackles grid system issues, such as access to the grid, and develops the role of the guarantees of origin. These measures build on existing provisions of Directive 2001/77/EC and of Directive 2002/91/EC on the energy performance of buildings, and provide for a common approach for the benefit of renewable energy producers and consumers across the Community. A Community approach to promoting renewables by these means is proportionate, because the level of ambition of the target requires coordinated action which addresses the sectors where most progress can be made.

Community action in the field of biofuel sustainability is justified, because it avoids the development of multiple national schemes which might impede trade to and within the Community.

In the Proposal, Member States retain wide discretion to favour the development of the renewable energy sector in the way that suits their national potential and circumstances best, including the option of achieving their targets by supporting the development of renewable energy in other Member States.

The Proposal therefore complies with the subsidiarity principle.

- **Proportionality principle and choice of instruments**

The Proposal complies with the proportionality principle for the following reasons:

An overall objective could not be reached without overall commitment, expressed in legally binding targets. As energy policy problems are threatening the Community as a whole, responses should be articulated at the same level.

The instrument chosen is a Directive that has to be implemented by the Member States. A Directive is the appropriate instrument for the promotion of renewable energy sources as it clearly defines the objectives to be reached, while leaving Member States sufficient flexibility to implement the Directive in the way that suits their particular national circumstances best. It goes further than a framework Directive in that it is more precise on objectives and more detailed on measures to be taken.

The Directive sets an overall binding target for the European Union of 20% renewable energy by 2020. In addition, it sets a 10% binding minimum target for the market share of biofuels in 2020 to be observed by all Member States.

For the rest, the Member States are free to develop the renewable energy sector that corresponds best to their national situation and potential, provided they collectively reach the 20% target.

The level of constraint imposed is thus proportionate to the objective aimed at.

4. BUDGETARY IMPLICATION

The Proposal has no implication for the Community budget.

5. ADDITIONAL INFORMATION

- **Simplification**

The Proposal provides for simplification of legislation.

Currently there are two Directives in the field of renewable energy: for electricity and biofuels. The third sector, heating and cooling has not been legislated at European level so far. The 2020 target setting and revision of the renewable energy sector offers an opportunity to propose one comprehensive Directive legislating all the three sectors of renewable energies. This makes it possible to put in place indivisible measures in the different sectors, to address cross cutting issues (e.g. administrative barriers).

A single Directive and single national action plans will encourage Member States to think of energy policy in a more integrated way concentrating on the best allocation of efforts.

Reporting is currently required under both Directives; it will be replaced with a single report under the proposed new Directive.

- **Repeal of existing legislation**

The adoption of the Proposal will lead to the repeal of existing legislation.

- **Review/revision/sunset clause**

The Proposal includes several review clauses.

- **Recasting**

The Proposal does not involve recasting.

- **Correlation table**

The Member States are required to communicate to the Commission the text of national provisions transposing the Directive as well as a correlation table between those provisions and this Directive.

- **European Economic Area (EEA)**

The proposed act concerns an EEA matter and should therefore extend to the European Economic Area.

Proposal for a

DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

on the promotion of the use of energy from renewable sources

(Text with EEA relevance)

THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION,

Having regard to the Treaty establishing the European Community, and in particular Article 175(1) thereof and Article 95 thereof

Having regard to the proposal from the Commission¹,

Having regard to the opinion of the European Economic and Social Committee²,

Having regard to the opinion of the Committee of the Regions³,

Acting in accordance with the procedure laid down in Article 251 of the Treaty⁴,

Whereas:

- (1) The increased use of energy from renewable sources constitutes an important part of the package of measures needed to reduce greenhouse gas emissions and comply with the Kyoto Protocol to the United Nations Framework Convention on Climate Change, and with further European and international greenhouse gas emission reduction commitments beyond 2012. It also has an important part to play in promoting security of energy supply, promoting technological development and providing opportunities for employment and regional development, especially in rural areas.
- (2) In particular, increased use of biofuels for transport is one of the most effective tools by which the Community can reduce its dependence on imported oil – where the security of supply problem is most acute - and influence the fuel market for transport.
- (3) Directive 2001/77/EC of the European Parliament and of the Council of 27 September 2001 on the promotion of electricity produced from renewable energy sources in the internal electricity market⁵ and Directive 2003/30/EC of the European Parliament and of the Council of 8 May 2003 on the promotion of the use of biofuels or other

¹ OJ C , , p. .

² OJ C , , p. .

³ OJ C , , p. .

⁴ OJ C , , p. .

⁵ OJ L 283, 27.10.2001, p. 33. Directive as last amended by Council Directive 2006/108/EC (OJ L 363, 20.12.2006, p. 414).

renewable fuels for transport⁶ established definitions for different types of renewable energy. Directive 2003/54/EC of the European Parliament and of the Council of 26 June 2003 concerning common rules for the internal market in electricity and repealing Directive 96/92/EC⁷ established definitions for the electricity sector in general. In the interests of stability and clarity it is appropriate to use the same definitions in this Directive.

- (4) The Renewable Energy Roadmap⁸ demonstrated that a 20% target for the overall share of energy from renewable sources and a 10% target for renewable energy in transport would be appropriate and achievable objectives, and that a framework that includes mandatory targets should provide the business community with the long term stability it needs to make rational investment decisions in the renewable energy sector.
- (5) The Brussels European Council of March 2007 reaffirmed the Community's commitment to the Community-wide development of renewable energies beyond 2010. It endorsed a mandatory target of a 20% share of renewable energies in overall Community energy consumption by 2020 and a mandatory 10% minimum target to be achieved by all Member States for the share of biofuels in transport petrol and diesel consumption by 2020, to be introduced in a cost-effective way. It stated that the binding character of the biofuel target is appropriate subject to production being sustainable, second-generation biofuels becoming commercially available and Directive 98/70/EC of the European Parliament and of the Council of 13 October 1998 relating to the quality of petrol and diesel fuels and amending Council Directive 93/12/EEC⁹ being amended to allow for adequate levels of blending.
- (6) The main purpose of binding targets is to provide certainty for investors. Deferring a decision about whether a target is binding until a future event takes place is thus not appropriate. In a statement to the minutes of the Council of 15 February 2007, the Commission therefore stated that it did not consider that the binding nature of the target should be deferred until second generation biofuels became commercially available.
- (7) The European Parliament, in its Resolution on the Roadmap for Renewable Energy in Europe, has called on the Commission to present by the end of 2007 a proposal for a renewable energy legislative framework, referring to the importance of setting targets for the shares of energy from renewable sources at Community and Member State level.
- (8) In the light of the positions taken by the Commission, the Council and the European Parliament, it is appropriate to establish mandatory targets for an overall 20% share of renewable energy and a 10% share of renewable energy in transport in the European Union's consumption in 2020.
- (9) Member States' starting points, renewable energy potentials and energy mixes vary. It is therefore necessary to translate the overall 20% target into individual targets for

⁶ OJ L 123, 17.5.2003, p. 42.

⁷ OJ L 176, 15.7.2003, p. 37.

⁸ COM(2006) 848.

⁹ OJ L 350, 28.12.1998, p. 58. Directive as last amended by Regulation (EC) No 1882/2003 (OJ L 284, 31.10.2003, p. 1).

each Member State, with due regard to a fair and adequate allocation taking account of different national starting points and potentials, including the existing level of renewable energies and energy mix. It is appropriate to do this by sharing the required total increase in the use of energy from renewable sources between Member States on the basis of an equal increase in each Member State's share weighted by their Gross Domestic Product, modulated to reflect national starting points, and by accounting in terms of final energy consumption..

- (10) By contrast, it is appropriate for the 10% target for renewable energy in transport to be set at the same level for each Member State in order to ensure consistency in transport fuel specifications and availability. Because transport fuels are traded easily, Member States with low endowments of the relevant resources will easily be able to obtain renewable transport fuels from elsewhere. While it would technically be possible for the Community to meet its biofuel target solely from domestic production, it is both likely and desirable that the target will in fact be met through a combination of domestic production and imports. To this end, the Commission should monitor the supply of the Community market for biofuels, and should, as appropriate, propose relevant measures to achieve a balanced approach between domestic production and imports, taking into account the development of multilateral and bilateral trade negotiations as well as environmental, cost, energy security and other considerations.
- (11) To ensure that the overall targets are achieved, Member States should work towards a an indicative trajectory tracing a path towards the achievement of their targets, and should establish a national action plan including sectoral targets, while having in mind that there are different uses of biomass and therefore it is essential to mobilise new biomass resources.
- (12) To permit the benefits of technological advance and economies of scale to be reaped, the indicative trajectory should take into account the possibility of a more rapid growth in the use of energy from renewable sources in later years. In this way, special attention can be given to sectors that disproportionately suffer from the absence of technological advance and economies of scale and therefore remain under-developed, but which in future could significantly contribute to reaching the targets for 2020.
- (13) The path should take 2005 as its starting point because that is the latest year for which reliable data on national renewable energy shares are available.
- (14) It is necessary to set unambiguous rules for calculating the share of energy from renewable sources.
- (15) In calculating the contribution of hydropower, the effects of climatic variation should be smoothed through the use of a normalisation rule.
- (16) Heat pumps using geothermal resources from the ground or water, and heat pumps using ambient heat from the air to transfer the thermal energy to a useful temperature level, need electricity to function. Heat pumps using ambient heat from the air often require the use of significant amounts of conventional energy. Therefore, only useful thermal energy coming from heat pumps using ambient heat from the air that meet the minimum requirements of the coefficient of performance established in Commission

Decision 2007/742/EC¹⁰, in accordance with Regulation (EC) No 1980/2000 of the European Parliament and of the Council of 17 July 2000 on a revised Community eco-label award scheme¹¹, should be taken into account for the purpose of measuring compliance with the targets established by this Directive.

- (17) Passive energy systems use building design to harness energy. This is considered to be saved energy. Therefore, to avoid double counting, energy harnessed in this way should not be taken into account for the purposes of this Directive.
- (18) Imported electricity, produced from renewable energy sources outside the Community, may count towards Member States' targets. However, to avoid a net increase in greenhouse gas emissions through the diversion of existing renewable sources and their complete or partial replacement by conventional energy sources, only electricity generated by renewable energy installations that become operational after the entry into force of this Directive should be eligible to be counted. To ensure that such imports can be tracked and accounted for in a reliable way, it is appropriate for them to take place within the framework of a system of guarantees of origin. Agreements with third countries concerning the organisation of this trade in electricity from renewable energy sources will be considered.
- (19) To create opportunities for reducing the cost of achieving the targets laid down in this Directive, it is appropriate both to facilitate the consumption in Member States of energy produced from renewable sources in other Member States, and also to enable Member States to count electricity, heating and cooling consumed in other Member States towards their own national targets. For this reason, harmonised provisions for the design and transfer of guarantees of origin in these sectors should be adopted.
- (20) The obligatory issuing, on request, of guarantees of origin for heating or cooling produced from renewable energy sources, should be limited to plants with a capacity of at least 5 MW_{th}, in order to avoid the unnecessarily high administrative burdens that would be imposed if smaller installations, including those in households, were to be included.
- (21) Member States should be able to establish systems of prior authorisation for the transfer of guarantees of origin to or from other Member States if they need to do so to ensure a secure and balanced energy supply, to achieve the environmental objectives that underlie their support scheme, or to comply with the targets laid down in this Directive. Such systems should be limited to what is necessary and proportionate and should not constitute a means of arbitrary discrimination.
- (22) Once the system of harmonised guarantees of origin has been tested, the Commission should review whether any further changes are needed.
- (23) To avoid interference with support schemes granted to existing installations and to avoid overcompensation of renewable energy producers, only guarantees of origin issued to installations that were commissioned after the date of entry into force of this Directive, or for production due to an increase, after that date, in the renewable energy capacity of an installation, should be transferable between Member States.

¹⁰ OJ L 301, 20.11.2007, p. 14.

¹¹ OJ L 237, 21.9.2000, p. 1.

- (24) The lack of transparent rules and coordination between the different authorisation bodies has been shown to hinder the deployment of renewable energy. Therefore the specific structure of the renewable energy sector should be taken into account when national, regional and local authorities review their administrative procedures for giving permission to construct and operate plants producing electricity, heating and cooling or transport fuels from renewable energy sources. Administrative approval procedures should be streamlined with clear deadlines for installations using energy from renewable sources. Planning rules and guidelines should be adapted to take into consideration cost effective and environmentally beneficial renewable heating and cooling and electricity equipment.
- (25) National technical specifications and other requirements falling within the scope of Directive 98/34/EC of the European Parliament and of the Council of 22 June 1998 laying down a procedure for the provision of information in the field of technical standards and regulations¹², relating for example to levels of quality, testing methods or conditions of use, should not create barriers for trade in renewable energy equipment and systems. Therefore, support schemes for renewable energy should not prescribe national technical specifications which deviate from existing European standards, or require the supported equipment and systems to be certified or tested in a specified location or by a specified entity.
- (26) At national and regional level, rules and obligations for minimum requirements of renewable energy use in new and refurbished buildings have led to considerable increases in renewable energy use. These measures should be encouraged in a wider European context, while promoting more energy-efficient renewable energy applications in building codes and regulations.
- (27) Information and training gaps, especially in the heating and cooling sector, should be removed in order to encourage the deployment of energy from renewable sources
- (28) A coordinated approach is needed to develop training and appropriate certification should be made available to small scale renewable energy equipment installers in order to avoid market distortions and to ensure high quality products and service provision for consumers. National certification schemes should be mutually recognised by Member States and should therefore be based on minimum harmonised principles, taking into account European technology standards, and existing training and qualification regimes for renewable energy equipment installers. Directive 2005/36/EC of the European Parliament and of the Council of 7 September 2005 on the recognition of professional qualifications¹³ should continue to apply to issues not governed by this Directive, such as the recognition of professional qualifications of installers not certified in one Member State.
- (29) While Directive 2005/36/EC lays down requirements for the mutual recognition of professional qualifications, including for architects, there is a further need to ensure that architects and planners properly consider the use of energy from renewable sources in their plans and designs. Member States should therefore provide clear

¹² OJ L 204, 21.7.1998.

¹³ OJ L 255, 30.9.2005, p. 22.

guidance. This should be done without prejudice to the provisions of Directive 2005/36/EC and in particular Articles 46 and 49 thereof.

- (30) The costs of connecting new producers of electricity from renewable energy sources to the electricity grid should be objective, transparent and non-discriminatory and due account should be taken of the benefit embedded generators bring to the grid.
- (31) In certain circumstances it is not possible to fully ensure transmission and distribution of electricity produced from renewable energy sources without affecting the reliability and safety of the grid system. In these circumstances it may be appropriate for financial compensation to be given to those producers.
- (32) Directive 2001/77/EC laid down the framework for the integration in the grid of electricity from renewable energy sources. However, there has been significant variation between Member States in the degree of integration actually achieved. For this reason it is necessary to strengthen the framework and to review its application periodically at national level.
- (33) Interconnection among countries eases integration of electricity from renewable energy sources. Besides smoothing variability, interconnection can reduce balancing costs, encourage true competition bringing about lower prices, and support the development of networks. Also, the sharing and optimal use of transmission capacity could help avoid excessive new build.
- (34) Biofuel production should be environmentally sustainable. Biofuels used for compliance with the targets laid down in this Directive, and those that benefit from national support systems, should therefore be required to fulfil criteria for environmental sustainability.
- (35) The introduction of environmental sustainability criteria for biofuels will not achieve its objective if it leads to products that do not fulfil the criteria and would otherwise have been used as biofuels being used, instead, as bioliquids in the heating or electricity sectors. For this reason, the environmental sustainability criteria should also apply to bioliquids in general.
- (36) The Brussels European Council of March 2007 invited the Commission to propose a comprehensive Directive on the use of all renewable energy sources, which could contain criteria and provisions to ensure sustainable provision and use of bioenergy. These criteria should form a coherent part of a wider scheme covering also bioliquids and not biofuels alone. Such sustainability criteria should therefore be included in this Directive. In order to avoid the additional costs to business and the environmental incoherence that would be associated with an inconsistent approach, it is essential for sustainability criteria in respect of biofuels to be aligned between this Directive and Directive 98/70/EC. The Commission should in addition review in 2010 whether other biomass applications should be included.
- (37) If land with high stocks of carbon in its soil or vegetation is converted for the cultivation of raw materials for biofuels and other bioliquids, some of the stored carbon will generally be released into the atmosphere, leading to the formation of carbon dioxide. The negative greenhouse gas impact of this can offset the positive greenhouse gas impact of the biofuels or bioliquid, in some cases by a wide margin.

The full carbon effects of such conversion should therefore be accounted for in calculating the greenhouse gas savings of particular biofuels and other bioliquids. This is necessary to ensure that the greenhouse gas saving calculation takes into account the totality of the carbon effects of the use of biofuels and other bioliquids.

- (38) In order to prevent unnecessary burdensome research by economic operators and in order to prevent conversion of high-carbon-stock land that in hindsight would prove to be not eligible for producing raw materials for biofuels and other bioliquids, those types of land whose carbon stock loss upon conversion could not, within a reasonable period taking into account the urgency of tackling climate change, be compensated by the greenhouse gas savings of producing biofuels and other bioliquids, should not be converted for the production of biofuels and other bioliquids. Inventories of worldwide carbon stocks lead to the conclusion that wetlands and continuously forested areas should be included in this category.
- (39) The incentives provided for in this Directive for biofuels and other bioliquids, and the increasing worldwide demand for biofuels and other bioliquids, should not have the effect of encouraging the destruction of bio-diverse lands. Such exhaustible resources, recognised in various international instruments to be of value to all mankind, should be preserved. Consumers in the Community, in addition, would find it morally unacceptable that their increased use of biofuels and other bioliquids could have the effect of destroying bio-diverse lands. For these reasons, it is necessary to provide criteria ensuring that biofuels and other bioliquids can only qualify for the incentives when it can be guaranteed that they do not originate in bio-diverse land. The criteria chosen consider forest as bio-diverse where it is undisturbed by significant human activity (following the definition used by the Food and Agriculture Organisation of the United Nations, the United Nations Economic Commission for Europe and the Ministerial Conference on the Protection of Forests in Europe¹⁴) or where it is protected by national laws for nature protection purposes. Further, considering the highly biodiverse nature of certain grasslands, it is also appropriate that biofuels made from raw materials originating in such lands should not qualify for the incentives provided for by this Directive. The Commission should establish appropriate criteria and/or geographical ranges to define such highly biodiverse grasslands in accordance with the best available scientific evidence and relevant international norms.
- (40) Where biofuels and other bioliquids are made from raw material produced in the EU, they should also comply with EU environmental requirements for agriculture. Applying such criteria to imports from third countries is administratively and technically unfeasible.
- (41) The environmental sustainability criteria will only be effective if they lead to changes in the behaviour of market actors. Market actors will only change their behaviour if biofuels and other bioliquids meeting the criteria command a price premium compared to those that do not. According to the mass balance method of verifying compliance, there is a physical link between the production of biofuels and other bioliquids meeting the criteria and the consumption of biofuels and other bioliquids in the Community, providing an appropriate balance between supply and demand and

¹⁴ Temperate and Boreal Forest Resources Assessment (2000); Ministerial Conference on the Protection of Forests in Europe (2003).

ensuring a price premium that is greater than in systems where there is no such link. Therefore to ensure that biofuels and other bioliquids meeting the environmental sustainability criteria can be sold at a higher price, maintaining the integrity of the system while at the same time avoiding imposing an unreasonable burden on industry, the mass balance system should be used to verify compliance. Other verification methods should however be reviewed.

- (42) It is in the interest of the Community to encourage the development of multilateral and bilateral agreements, and voluntary international or national schemes setting standards for the production of sustainable biofuels and other bioliquids, and certifying that production of biofuels and other bioliquids meets those standards. For that reason, provision should be made to decide that such agreements or schemes provide reliable evidence and data, provided that they meet adequate standards of reliability, transparency and independent auditing.
- (43) It is necessary to lay down clear rules for the calculation of greenhouse gas emissions from biofuels and other bioliquids and their fossil fuel comparators.
- (44) In the calculation of greenhouse gas emissions from the production and use of fuels, co-products should be accounted for. For policy analysis purposes the substitution method is appropriate. For regulatory purposes concerning individual operators and individual consignments of transport fuels, the substitution method is not appropriate. In these cases the energy allocation method is the most appropriate method to use, because it is easy to apply, predictable over time, minimises counter-productive incentives and gives results that are generally comparable with the range of results given by the substitution method. For policy analysis purposes the Commission should also, in its reporting, give results using the substitution method.
- (45) In order to avoid a disproportionate administrative burden, a list of default values should be laid down for common biofuel production pathways. Biofuels and other bioliquids should always be entitled to claim the level of greenhouse gas savings established by this list. Where the default value for greenhouse gas savings from a production pathway lies below the required minimum level of greenhouse gas savings, producers wishing to demonstrate their compliance with this minimum level should be required to show that actual emissions from their production process are lower than those that were assumed in the calculation of the default values.
- (46) In order to avoid encouraging the cultivation of raw materials for biofuels and other bioliquids in places where this would lead to high greenhouse gas emissions, the use of default values for cultivation should be limited to regions where such an effect can reliably be ruled out.
- (47) The requirements for a sustainability scheme for energy uses of biomass, other than bioliquids and biofuels, should be analysed by the Commission by 2010, taking into account the need for biomass resources to be managed in a sustainable manner.
- (48) In order to permit the achievement of a 10% share of biofuels, it is necessary to ensure the placing on the market of higher blends of biodiesel in diesel than those envisaged by standard EN590/2004.

- (49) In order to ensure that biofuels that diversify the range of feedstocks used become commercially viable, these biofuels should receive an extra weighting under national biofuel obligations.
- (50) Regular reporting is needed to ensure a continuing focus on progress in the development of renewable energy at national and Community level.
- (51) Support measures taken pursuant to this Directive that constitute State aid in the sense of Article 87 of the Treaty have to be notified to and approved by the Commission before their implementation, pursuant to Article 88(3) of the Treaty. Information provided to the Commission on the basis of this Directive does not substitute for the obligation of Member States under the notification obligation pursuant to Article 88(3) of the Treaty.
- (52) When designing their support systems, Member States may encourage the use of biofuels which give additional benefits – including the benefits of diversification offered by biofuels made from wastes, residues, non-food cellulosic material, and ligno-cellulosic material – by taking due account of the different costs of producing energy from traditional biofuels on the one hand and of these biofuels which give additional benefits on the other hand. Member States may encourage investment in the development of renewable energy technologies that need time to become competitive.
- (53) Since the primary purpose of the measures provided for in Articles 15 to 17 of this Directive is to ensure the proper functioning of the internal market by harmonising the conditions of sustainability that biofuels and other bioliquids must meet for certain purposes and thus facilitating the trade between Member States in biofuels and other bioliquids which comply with these conditions, they are based on Article 95 of the Treaty. Since the primary purpose of all other measures provided for in this Directive is the protection of the environment, they are based on Article 175(1) of the Treaty.
- (54) The measures necessary for the implementation of this Directive should be adopted in accordance with Council Decision 1999/468/EC of 28 June 1999 laying down the procedures for the exercise of implementing powers conferred on the Commission¹⁵.
- (55) In particular, power should be conferred on the Commission to adapt the methodological principles and values necessary for assessing whether environmental sustainability criteria have been fulfilled in relation to biofuels and other bioliquids and to adapt the energy content of transport fuels to technical and scientific progress. Since those measures are of general scope and are designed to amend non-essential elements of this Directive by the adaptation of the methodological principles and values, they must be adopted in line with the regulatory procedure with scrutiny provided for in Article 5a of Decision 1999/468/EC.
- (56) Those provisions of Directive 2001/77/EC and Directive 2003/30/EC that overlap with the provisions of this Directive should be deleted from the latest possible moment for its transposition. Those that deal with targets and reporting for 2010 should remain in force until the end of 2011. It is therefore necessary to amend Directive 2001/77/EC and Directive 2003/30/EC accordingly.

¹⁵ OJ L 184, 17.7.1999, p. 23. Decision as amended by Decision 2006/512/EC (OJ L 200, 22.7.2006, p. 11).

- (57) Since the general objectives of achieving a 20% share of renewable energies in the Community's overall energy consumption and a 10% share of biofuels in each Member State's transport petrol and diesel consumption by 2020 cannot be sufficiently achieved by the Member States and can therefore, by reason of the scale of the action, be better achieved at Community level, the Community may adopt measures, in accordance with the principle of subsidiarity as set out in Article 5 of the Treaty. In accordance with the principle of proportionality, as set out in that Article, this Directive does not go beyond what is necessary in order to achieve those objectives.

HAVE ADOPTED THIS DIRECTIVE:

Article 1
Scope

This Directive establishes a common framework for the promotion of energy from renewable sources. It sets mandatory targets for the overall share of energy from renewable sources in energy consumption and for the share of energy from renewable sources in transport. It lays down rules relating to guarantees of origin, administrative procedures and electricity grid connections in relation to energy from renewable sources. It establishes environmental sustainability criteria for biofuels and other bioliquids.

Article 2
Definitions

For the purposes of this Directive, the definitions in Directive 2003/54/EC shall apply.

The following definitions shall also apply:

- (a) "*energy from renewable sources*" means renewable non-fossil energy sources: wind, solar, geothermal, wave, tidal, hydropower, biomass, landfill gas, sewage treatment plant gas and biogases;
- (b) "*biomass*" means the biodegradable fraction of products, waste and residues from agriculture (including vegetal and animal substances), forestry and related industries, as well as the biodegradable fraction of industrial and municipal waste;
- (c) "*final consumption of energy*" means the energy commodities delivered for energy purposes to manufacturing industry, transport, households, services, agriculture, forestry and fisheries, including the consumption of electricity and heat by the energy branch for electricity and heat production and including losses of electricity and heat in distribution;
- (d) "*district heating or cooling*" means the distribution of thermal energy in the form of steam, hot water or chilled liquids, from a central source of production through a network to multiple buildings, for the use of space or process heating or cooling;
- (e) "*bioliquids*" means liquid fuel for energy purposes produced from biomass;

- (f) "*biofuels*" means liquid or gaseous fuel for transport produced from biomass;
- (g) "*guarantee of origin*" means an electronic document which has the function of providing proof that a given quantity of energy was produced from renewable sources;
- (h) "*support scheme*" means a scheme, originating from a market intervention by a Member State, that helps energy from renewable sources to find a market by reducing the cost of production of this energy, increasing the price at which it can be sold, or increasing, by means of a renewable energy obligation or otherwise, the volume of such energy purchased;
- (i) "*renewable energy obligation*" means a national support scheme requiring energy producers to include a given proportion of energy from renewable sources in their production, requiring energy suppliers to include a given proportion of energy from renewable sources in their supply or requiring energy consumers to include a given proportion of energy from renewable sources in their consumption.

Article 3

Targets for the use of energy from renewable sources

1. Each Member State shall ensure that the share of energy from renewable sources in final consumption of energy in 2020 is at least their overall target for the share of energy from renewable sources in that year, as set out in the third column of the table in Part A of Annex I.
2. Member States shall introduce appropriate measures to ensure that the share of energy from renewable sources equals or exceeds that shown in the indicative trajectory set out in Part B of Annex I.
3. Each Member State shall ensure that the share of energy from renewable sources in transport in 2020 is at least 10% of final consumption of energy in transport in that Member State.

In calculating total energy consumed in transport for the purposes of the first subparagraph, petroleum products other than petrol and diesel shall not be taken into account.

Article 4

National action plans

1. Each Member State shall adopt a national action plan.

The national action plans shall set out Member States' targets for the shares of energy from renewable sources in transport, electricity and heating and cooling in 2020, and adequate measures to be taken to achieve these targets, including national policies to develop existing biomass resources and mobilise new biomass resources for different uses, and the measures to be taken to fulfil the requirements of Articles 12 to 17.

2. Member States shall notify their national action plans to the Commission by 31 March 2010 at the latest.
3. A Member State whose share of energy from renewable sources fell below the indicative trajectory in Part B of Annex 1 in the immediately preceding two-year period shall submit a new national action plan to the Commission by 30 June of the following year at the latest, setting out adequate measures to ensure that in future the share of energy from renewable sources equals or exceeds the indicative trajectory in Part B of Annex I.

Article 5

Calculation of the share of energy from renewable sources

1. The final consumption of energy from renewable sources in each Member State shall be calculated as the sum of:
 - (a) final consumption of electricity from renewable energy sources;
 - (b) final consumption of energy from renewable sources for heating and cooling; and
 - (c) final energy from renewable sources consumed in transport.

Gas, electricity and hydrogen from renewable energy sources shall only be considered once in either 1(a), 1(b) or 1(c) for calculating the share of final consumption of energy from renewable sources.

Biofuels and other bioliquids that do not fulfil the environmental sustainability criteria in Article 15 shall not be taken into account.

2. Member States may apply to the Commission for account to be taken, for the purposes of paragraph 1, of the construction of renewable energy plants with very long lead-times on their territory under the following conditions:
 - (a) construction of the renewable energy plant must have started by 2016;
 - (b) the renewable energy plant must have a production capacity equal to or in excess of 5000 MW;
 - (c) it must not be possible for the plant to become operational by 2020;
 - (d) it must be possible for the plant to become operational by 2022.

The Commission shall decide what adjustment shall be made to the Member State's share of energy from renewable sources for the year 2020, taking into account the state of advancement of construction, the amount of financial support being provided to the plant, and the quantity of renewable energy to be produced by the plant in an average year when completed.

Acting in accordance with the procedure referred to in Article 21(2), the Commission shall develop rules for the implementation of this provision by 31 December 2012 at the latest.

3. Where a Member State considers that, due to *force majeure*, it is under an impossibility to meet the share of energy from renewable sources in final consumption of energy in 2020 set out in the third column of the table in Annex 1, it shall inform the Commission as soon as possible. The Commission shall adopt a decision on whether *force majeure* has been demonstrated, in which case it shall decide what adjustment shall be made to the Member State's final consumption of energy from renewable sources for the year 2020.
4. For the purposes of paragraph 1(a), final consumption of electricity from renewable sources shall be calculated as the quantity of electricity produced in a Member State from renewable energy sources, excluding the production of electricity by pumped storage units using water that has previously been pumped uphill, adjusted in accordance with Article 10.

In multi-fuel plants using renewable and conventional sources, only the part of electricity produced from renewable energy sources shall be taken into account. For the purposes of this calculation, the contribution of each energy source shall be calculated on the basis of its energy content.

The electricity generated by hydropower shall be accounted for in accordance with the normalisation rule in Annex II.

5. For the purposes of paragraph 1(b), the final consumption of energy from renewable sources for heating and cooling shall be calculated as the consumption of energy from renewable sources delivered to manufacturing industry, transport, households, services, agriculture, forestry and fisheries for heating and cooling purposes, including consumption from district heating or cooling of renewable origin, adjusted in accordance with Article 10.

Thermal energy generated by heat pumps using geothermal energy from the ground or water shall be taken into account for the purposes of paragraph 1(b). Thermal energy generated by heat pumps using ambient heat from the air shall be taken into account for the purposes of paragraph 1(b), provided that the energy efficiency of such heat pumps meets the minimum requirements of eco-labelling laid down pursuant to Regulation (EC) No 1980/2000, where applicable, in particular the minimum coefficient of performance established in Decision 2007/742/EC, and reviewed in accordance with that Regulation.

Thermal energy generated by passive energy systems, under which lower energy consumption is achieved passively through building design or from heat generated by energy from non-renewable sources, shall not be taken into account for the purposes of paragraph 1(b).

6. The energy content of the transport fuels listed in Annex III shall be taken to be as set out in that Annex. Annex III may be adapted to technical and scientific progress. Such a measure designed to amend non-essential elements of this Directive shall be

adopted in accordance with the regulatory procedure with scrutiny referred to in Article 21(3).

7. The share of energy from renewable energy sources shall be calculated as the final consumption of energy from renewable sources divided by the final consumption of energy from all energy sources, expressed as a percentage.
8. The methodology and definitions used in the calculation of the share of energy from renewable sources shall be those of Regulation (EC) No xx/xx on energy statistics¹⁶.
9. Electricity produced from renewable energy sources in third countries shall only be taken into account for the purposes of measuring compliance with the requirements of this Directive concerning national targets if:
 - (a) it is consumed in the Community;
 - (b) the electricity is produced by an installation that became operational after the date of entry into force of this Directive; and
 - (c) the electricity is issued with a guarantee of origin that forms part of a system of guarantee of origin equivalent to that laid down by this Directive.

Article 6

Guarantees of origin of electricity, heating and cooling produced from renewable energy sources

1. Member States shall ensure that the origin of electricity produced from renewable energy sources, and of heating or cooling produced from renewable energy sources in plants with a capacity of at least 5 MW_{th}, can be guaranteed as such within the meaning of this Directive.

To that end, Member States shall ensure that a guarantee of origin is issued in response to a request from a producer of renewable energy. A guarantee of origin shall be of the standard size of 1 MWh. No more than one guarantee of origin shall be issued in respect of each MWh of energy produced.

2. Guarantees of origin shall be issued, transferred and cancelled electronically. They shall be accurate, reliable and fraud-resistant.

A guarantee of origin shall specify, at least:

- (a) the energy source from which the energy was produced and the starting and ending dates of its production;
- (b) whether the guarantee of origin relates to
 - (i) electricity; or
 - (ii) heating and/or cooling;

¹⁶ [Energy Statistics Regulation].

- (c) the identity, location, type and capacity of the installation where the energy was produced, and the date of the installation's becoming operational;
 - (d) the date and country of issue and a unique identification number;
 - (e) the amount and type of any investment aid that has been given for the installation.
3. Member States shall recognise guarantees of origin issued by other Member States in accordance with this Directive. Any refusal by a Member State to recognise a guarantee of origin shall be based on objective, transparent and non-discriminatory criteria.
- In the event of refusal to recognise a guarantee of origin, the Commission may adopt a Decision requiring the Member State in question to recognise it.
4. Member States shall ensure that all guarantees of origin to be issued in respect of renewable energy generated in a given calendar year are issued, at the latest, three months after the end of that year.

Article 7

Competent bodies and registers of guarantees of origin

1. Each Member State shall designate a single competent body to undertake the following tasks:
- (a) establish and maintain a national register of guarantees of origin;
 - (b) issue guarantees of origin;
 - (c) record any transfer of guarantees of origin;
 - (d) cancel guarantees of origin;
 - (e) publish an annual report on the quantities of guarantees of origin issued, transferred to or from each of the other competent bodies and cancelled.
2. The competent body shall not carry out any energy generation, trade, supply or distribution activities.
3. The national register of guarantees of origin shall record the guarantees of origin held by each person. A guarantee of origin shall only be held in one register at one time.

Article 8

Submission of guarantees of origin for cancellation

1. A guarantee of origin, corresponding to the unit of energy in question, shall be submitted for cancellation to a competent body designated in accordance with Article 7 when:

- (a) the production of a unit of electricity from renewable energy sources, or the production of a unit of heating or cooling from renewable energy sources in a plant with a capacity of at least 5 MW_{th}, receives support in the form of feed-in tariff payments, premium payments, tax reductions or payments resulting from calls for tenders, in which case the guarantee shall be submitted to the competent body designated by the Member State that established the system of support;
 - (b) a unit of electricity produced from renewable energy sources, or a unit of heating or cooling produced from renewable energy sources in a plant with a capacity of at least 5 MW_{th}, is taken into account for the purposes of assessing an entity's compliance with a renewable energy obligation, in which case the guarantee of origin shall be submitted to the competent body designated by the Member State that established the obligation; or
 - (c) an energy supplier or energy consumer chooses to use a guarantee of origin for the purpose of proving the share or quantity of renewable energy in its energy mix, without claiming the benefits of a support scheme in accordance with points (a) and (b); in this case, the guarantee of origin shall be submitted to the competent body designated by the Member State in which the energy described by the energy mix in question is consumed.
2. Where an operator has submitted one or more guarantees of origin to a competent body in accordance with paragraphs 1(a) or (b), the operator shall:
 - (a) request guarantees of origin, in accordance with Article 6(1), for all future production of renewable energy sources from the same installation;
 - (b) submit these guarantees of origin for cancellation to the same competent body.
3. Guarantees of origin shall not be submitted to a competent body for cancellation more than 1 year after their date of issue.

Article 9

Transfer of guarantees of origin

1. Member States whose share of energy from renewable sources equalled or exceeded the indicative trajectory in Part B of Annex I in the immediately preceding two-year period may request the competent bodies designated in accordance with Article 7 to transfer the guarantees of origin submitted for cancellation under Article 8(1) to another Member State. Such guarantees of origin shall immediately be cancelled by the competent body in the receiving Member State.
2. Member States may provide for a system of prior authorisation for the transfer of guarantees of origin to or from persons in other Member States if, in the absence of such a system, the transfer of guarantees of origin to or from the Member State concerned is likely to impair their ability to ensure a secure and balanced energy supply or is likely to undermine the achievement of the environmental objectives underlying their support scheme.

Member States may provide for a system of prior authorisation for the transfer of guarantees of origin to persons in other Member States if in the absence of such a system, the transfer of guarantees of origin is likely to impair their ability to comply with Article 3(1) or to ensure that the share of energy from renewable sources equals or exceeds the indicative trajectory in Part B of Annex I.

The system of prior authorisation shall not constitute a means of arbitrary discrimination.

3. Subject to the provisions adopted pursuant to paragraph 2, guarantees of origin may be transferred between persons in different Member States provided they have been issued in relation to energy produced from renewable sources by installations that became operational after the date of entry into force of this Directive.

Such transfer may accompany the transfer of the energy to which the guarantee of origin relates, or may be separate from any such transfer.

4. Member States shall notify the Commission of any system of prior authorisation they intend to have in force pursuant to paragraph 2, and any subsequent changes thereto.

The Commission shall publish that information.

5. By 31 December 2014 at the latest, depending on data availability, the Commission shall assess the implementation of the provisions of this Directive for the transfer of guarantees of origin between Member States and the costs and benefits of this. It shall, if appropriate, submit proposals to the European Parliament and to the Council.

Article 10

Effects of the cancellation of the guarantees of origin

When a competent body cancels a guarantee of origin that it did not itself issue, an equivalent quantity of energy from renewable sources shall, for the purposes of measuring compliance with the requirements of this Directive concerning national targets:

- (a) be deducted from the quantity of energy from renewable sources that is taken into account, in relation to the year of production of the energy specified in the guarantee of origin, in measuring compliance by the Member State of the competent body that issued the guarantee of origin; and
- (b) be added to the quantity of energy from renewable sources that is taken into account, in relation to the year of production of the energy specified in the guarantee of origin, in measuring compliance by the Member State of the competent body that cancelled the guarantee of origin.

Article 11

Capacity increases

For the purpose of Article 5(9), Article 6(2), Article 8(2) and Article 9(3) units of renewable energy imputable to an increase in the capacity of an installation shall be treated as if they

were produced by a separate installation becoming operational at the moment at which the increase of capacity occurred.

Article 12

Administrative procedures, regulations and codes

1. Member States shall ensure that any national rules concerning the authorisation, certification and licensing procedures that are applied to plants for the production of electricity, heating or cooling from renewable sources, and to the process of transformation of biomass into biofuels or other energy products, are proportionate and necessary.

Member States shall, in particular, ensure that:

- (a) the respective responsibilities of national, regional and local administrative bodies for authorisation, certification and licensing procedures are clearly defined, with precise deadlines for approving planning and building applications;
 - (b) administrative procedures are streamlined and expedited at the appropriate administrative level;
 - (c) rules governing authorisation, certification and licensing are objective, transparent and non-discriminatory, and take fully into account the particularities of individual renewable energy technologies;
 - (d) clear guidelines are established for coordination between administrative bodies, concerning time limits and the receipt and handling of planning and permit applications;
 - (e) administrative charges paid by consumers, planners, architects, builders and equipment and system installers and suppliers are transparent and cost-related;
 - (f) less burdensome authorisation procedures are established for smaller projects; and
 - (g) mediators are designated to act in disputes between applicants and authorities responsible for issuing authorisations, certificates and licenses.
2. Member States shall clearly define any technical specifications which must be met by renewable energy equipment and systems in order to benefit from support schemes. Where European standards exist, including eco-labels, energy labels and other technical reference systems established by the European standardisation bodies, such technical specifications shall be expressed in terms of those standards. Such technical specifications shall not prescribe where the equipment and systems are to be certified.
 3. Member States shall require local and regional administrative bodies to consider the installation of equipment and systems for the use of heating, cooling and electricity from renewable sources and for district heating and cooling when planning, designing, building and refurbishing industrial or residential areas.

4. In their building regulations and codes Member States shall require the use of minimum levels of energy from renewable sources in new or refurbished buildings. Any exemption from those minimum levels shall be transparent and based on criteria relating to:
 - (a) the use of passive, low or zero energy buildings; or
 - (b) local limitations in the availability of renewable energy resources.
5. With respect to their building regulations and codes, Member States shall promote the use of renewable energy heating and cooling systems and equipment that achieve a significant reduction of energy consumption. Member States shall use energy or eco-labels or other appropriate certificates or standards developed at national or European level, where these exist, as the basis for encouraging such systems and equipment.

In the case of biomass, Member States shall promote conversion technologies that achieve a conversion efficiency of at least 85% for residential and commercial applications and at least 70% for industrial applications.

In the case of heat pumps, Member States shall promote heat pumps which achieve the minimum requirements of eco-labelling established in Decision 2007/742/EC.

In the case of solar energy, Member States shall promote equipment and systems that achieve a conversion efficiency of at least 35%.

In assessing the conversion efficiency and input/output ratio of systems and equipment for the purposes of this paragraph, Member States shall use Community or, failing these, international procedures if such procedures exist.

Article 13 **Information and training**

1. Member States shall ensure that information on support measures is made available to consumers, builders, installers, architects and suppliers of heating, cooling and electricity equipment and systems and of vehicles compatible with the use of high biofuel blends or pure biofuels.
2. Member States shall ensure that information on the net benefits, cost and energy efficiency of equipment and systems for the use of heating, cooling and electricity from renewable sources is made available either by the supplier of the equipment or system or by the national competent authorities.
3. Member States shall develop certification schemes for installers of small-scale biomass boilers and stoves, solar photovoltaic and solar thermal systems and heat pumps. Those schemes shall be based on the criteria laid down in Annex IV. Each Member State shall recognise certification awarded by other Member States in accordance with these criteria.
4. Member States shall develop guidance for planners and architects so that they are able properly to consider the use of energy from renewable sources and of district

heating and cooling when planning, designing, building and renovating industrial or residential areas.

Article 14
Access to the electricity grid

1. Member States shall take the necessary steps to develop grid infrastructure to accommodate the further development of electricity production from renewable energy sources, including interconnectors between Member States.
2. Without prejudice to the maintenance of the reliability and safety of the grid, Member States shall ensure that transmission system operators and distribution system operators in their territory guarantee the transmission and distribution of electricity produced from renewable energy sources. They shall also provide for priority access to the grid system of electricity produced from renewable energy sources. When dispatching electricity generating installations, transmission system operators shall give priority to generating installations using renewable energy sources insofar as the security of the national electricity system permits.
3. Member States shall require transmission system operators and distribution system operators to set up and publish their standard rules relating to the bearing and sharing of costs of technical adaptations, such as grid connections and grid reinforcements, which are necessary in order to integrate new producers feeding electricity produced from renewable energy sources into the interconnected grid.

These rules shall be based on objective, transparent and non-discriminatory criteria taking particular account of all the costs and benefits associated with the connection of these producers to the grid and of the particular circumstances of producers located in peripheral regions and in regions of low population density. The rules may provide for different types of connection.

4. Where appropriate, Member States may require transmission system operators and distribution system operators to bear, in full or in part, the costs referred to in paragraph 3. Member States shall review and take the necessary measures to improve the frameworks and rules for bearing and sharing of costs referred to in paragraph 3 by 30 June 2011 at the latest and every two years thereafter to ensure the integration of new producers as referred to in that paragraph.
5. Member States shall require transmission system operators and distribution system operators to provide any new producer wishing to be connected to the system with a comprehensive and detailed estimate of the costs associated with the connection. Member States may allow producers of electricity from renewable energy sources wishing to be connected to the grid to issue a call for tender for the connection work.
6. The sharing of costs referred in paragraph 3 shall be enforced by a mechanism based on objective, transparent and non-discriminatory criteria taking into account the benefits which initially and subsequently connected producers as well as transmission system operators and distribution system operators derive from the connections.

7. Member States shall ensure that the charging of transmission and distribution fees does not discriminate against electricity from renewable energy sources, including in particular electricity from renewable energy sources produced in peripheral regions, such as island regions, and in regions of low population density.
8. Member States shall ensure that fees charged by transmission system operators and distribution system operators for the transmission and distribution of electricity from plants using renewable energy sources reflect realisable cost benefits resulting from the plant's connection to the network. Such cost benefits could arise from the direct use of the low-voltage grid.

Article 15

Environmental sustainability criteria for biofuels and other bioliquids

1. Biofuels and other bioliquids shall be taken into account for the purposes listed under letters (a), (b) and (c) below only if they fulfil the criteria set out in paragraphs 2 to 5:
 - (a) measuring compliance with the requirements of this Directive concerning national targets;
 - (b) measuring compliance with renewable energy obligations;
 - (c) eligibility for financial support for the consumption of biofuels and other bioliquids.
2. The greenhouse gas emission saving from the use of biofuels and other bioliquids taken into account for the purposes referred to in paragraph 1 shall be at least 35%.

In the case of biofuels and other bioliquids produced by installations that were in operation in January 2008, the first subparagraph shall apply from 1 April 2013.
3. Biofuels and other bioliquids taken into account for the purposes referred to in paragraph 1 shall not be made from raw material obtained from land with recognised high biodiversity value, that is to say land that had one of the following statuses in or after January 2008, whether or not the land still has this status:
 - (a) forest undisturbed by significant human activity, that is to say, forest where there has been no known significant human intervention or where the last significant human intervention was sufficiently long ago to have allowed the natural species composition and processes to have become re-established;
 - (b) areas designated for nature protection purposes, unless evidence is provided that the production of that raw material did not interfere with those purposes;
 - (c) highly biodiverse grassland, that is to say grassland that is species-rich, not fertilised and not degraded.

The Commission shall establish the criteria and geographic ranges to determine which grassland shall be covered by point (c). Such a measure designed to amend non-essential elements of this Directive shall be adopted in accordance with the regulatory procedure with scrutiny referred to in Article 21(3).

4. Biofuels and other bioliquids taken into account for the purposes referred to in paragraph 1 shall not be made from raw material obtained from land with high carbon stock, that is to say land that had one of the following statuses in January 2008 and no longer has this status:
 - (a) wetlands, that is to say land that is covered with or saturated by water permanently or for a significant part of the year, including pristine peatland;
 - (b) continuously forested areas, that is to say land spanning more than 1 hectare with trees higher than 5 metres and a canopy cover of more than 30%, or trees able to reach these thresholds *in situ*;

The provisions in this paragraph shall not apply if at the time the raw material was obtained, the land had the same status as it had in January 2008.

5. Agricultural raw materials cultivated in the Community and used for the production of biofuels and other bioliquids taken into account for the purposes referred to in paragraph 1, shall be obtained in accordance with the requirements and standards under the provisions listed in point A of Annex III to Council Regulation (EC) No 1782/2003¹⁷ under the heading "Environment" and in accordance with the minimum requirements for good agricultural and environmental condition defined pursuant to Article 5(1) of that Regulation.
6. Member States shall not refuse to take into account, for the purposes referred to in paragraph 1, biofuel and other bioliquids obtained in compliance with this Article, on other grounds of sustainability.
7. The Commission shall report on requirements for a sustainability scheme for energy uses of biomass, other than biofuels and other bioliquids, by 31 December 2010 at the latest. The report shall be accompanied, where appropriate, by proposals for a sustainability scheme for other energy uses of biomass, to the European Parliament and the Council.

Article 16

Verification of compliance with the environmental sustainability criteria for biofuels and other bioliquids

1. Where biofuels and other bioliquids are to be taken into account for the purposes referred to in Article 15(1), Member States shall require economic operators to show that the environmental sustainability criteria set out in Article 15 have been fulfilled. For this purpose they shall require economic operators to use a mass balance system providing the following:
 - (a) consignments of raw material or biofuel with differing sustainability characteristics can be mixed;
 - (b) information about the sustainability characteristics and sizes of the consignments referred to in point (a) remains assigned to the mixture; and

¹⁷ OJ L 270, 21.10.2003, p. 56.

- (c) it is ensured that the sum of all consignments withdrawn from the mixture is described as having the same sustainability characteristics, in the same quantities, as the sum of all consignments added to the mixture.
2. The Commission shall report to the European Parliament and the Council in 2010 and 2012 on the operation of the mass balance verification method described in paragraph 1 and on the potential to allow for other verification methods in relation to some or all types of raw material or biofuel. In its assessment the Commission shall consider those verification methods in which information about sustainability characteristics need not remain physically assigned to particular consignments or mixtures. The assessment shall take into account the need to maintain the integrity and effectiveness of the verification system while avoiding imposing an unreasonable burden on industry. The report shall be accompanied, where appropriate, by proposals on allowing other verification methods, to the European Parliament and the Council.
 3. Member States shall require economic operators to submit reliable information and to make available to the Member State, on request, the data that were used to develop the information. Member States shall require economic operators to arrange for an adequate standard of independent auditing of the information they submit, and to provide evidence that this has been done. The auditing shall verify that the systems used by economic operators are accurate, reliable and fraud-resistant. It shall evaluate the frequency and methodology of sampling and the robustness of the data.
 4. The Commission may decide that bilateral and multilateral agreements between the Community and third countries demonstrate that biofuels and other bioliquids produced from raw materials cultivated in those countries comply with the environmental sustainability criteria in paragraphs 3 or 4 of Article 15.

The Commission may decide that voluntary national or international schemes setting standards for the production of biomass products contain accurate data for the purposes of Article 15(2) or demonstrate that consignments of biofuel comply with the environmental sustainability criteria in paragraphs 3 or 4 of Article 15.

The Commission may decide that national, multinational or international schemes to measure greenhouse gas savings contain accurate data for the purposes of Article 15(2).

5. The Commission shall only adopt decisions pursuant to in paragraph 4 if the agreement or scheme in question meets adequate standards of reliability, transparency and independent auditing. In the case of schemes to measure greenhouse gas savings, such schemes shall also comply with the methodological requirements in Annex VII.
6. Decisions pursuant to paragraph 4 shall be adopted in accordance with the procedure referred to in Article 21(2). Such decisions shall be valid for a period of no more than 5 years.
7. When an economic operator proffers proof or data obtained in accordance with an agreement or scheme that has been the subject of a decision pursuant to paragraph 4,

a Member State shall not require the supplier to provide further evidence of compliance with the corresponding environmental sustainability criterion.

8. At the request of a Member State or on its own initiative the Commission shall examine the application of Article 15 in relation to a source of biofuel or other bioliquid and, within six months of receipt of a request and in accordance with the procedure referred to in Article 21(2), decide whether the Member State concerned may take biofuel or bioliquid from that source into account for the purposes listed in Article 15(1).

Article 17

Calculation of the greenhouse gas impact of biofuels and other bioliquids

1. The greenhouse gas emission saving from the use of biofuel and other bioliquids for the purposes of Article 15(2) shall be calculated as follows:
 - (a) for biofuels, where a default value for greenhouse gas emission savings for the biofuel production pathway is laid down in Part A or B of Annex VII, by using that default value;
 - (b) by using an actual value calculated in accordance with the methodology laid down in Part C of Annex VII; or
 - (c) by using a value calculated in accordance with the methodology laid down in Part C of Annex VII as the sum of actual values for some of the steps of the production process and the disaggregated default values in Part D or E of Annex VII for the other steps of the production process.
2. By 31 March 2010 at the latest, Member States shall submit to the Commission a report including a list of those entities of their territory classified as NUTS 2 level in Regulation (EC) No 1059/2003 of the European Parliament and of the Council¹⁸ where the typical greenhouse gas emissions from cultivation of agricultural raw materials can be expected to be lower than or equal to the emissions reported under the heading "cultivation" in part D of Annex VII to this Directive, accompanied by a description of the method and data used to establish that list. The method shall take into account soil characteristics, climate and expected raw material yields.
3. The default values in Part A of Annex VII for biofuels, and the disaggregated default values for cultivation in Part D of Annex VII for biofuels and other bioliquids, shall apply only when their raw materials are cultivated:
 - (a) outside the Community; or
 - (b) in the Community in regions included in the lists referred to in paragraph 2.

For biofuels and other bioliquids falling under neither of the preceding subparagraphs actual values for cultivation shall be used.

¹⁸ OJ L 154, 21.6.2003, p. 1.

4. The Commission shall report by 31 December 2012 at the latest on the estimated typical and default values in Annex VII Part B and Part E, paying special attention to emissions from transport and processing, and may, where necessary, decide to correct the values. Such a measure designed to amend non-essential elements of this Directive shall be adopted in accordance with the regulatory procedure with scrutiny referred to in Article 21(3).
5. Annex VII may be adapted to technical and scientific progress. Such a measure designed to amend non-essential elements of this Directive shall be adopted in accordance with the regulatory procedure with scrutiny referred to in Article 21(3). Any adaptation of or addition to the list of default values in Annex VII shall respect the following rules:
 - (a) where the contribution of a factor to overall emissions is small, or where there is limited variation, or where the cost or difficulty of establishing actual values is high, default values shall be typical of normal production processes;
 - (b) in all other cases default values shall be conservative compared to normal production processes.

Article 18

Specific provisions related to biofuels

1. Member States shall ensure that information is given to the public on the availability of biofuels and other renewable transport fuels. For percentages of biofuels, blended in mineral oil derivatives, exceeding the limit value of 10% by volume, Member States shall require this to be indicated at the sales points.
2. Member States shall ensure that diesel fuel complying with the specifications set out in Annex V is made available by 31 December 2010 at the latest in filling stations with more than two pumps that sell diesel fuel.
3. Member States shall ensure that diesel fuel complying with the specifications set out in Annex VI, or other diesel fuel with at least 5% biofuel content by volume, is made available by 31 December 2014 at the latest in filling stations with more than two pumps that sell diesel fuel.
4. For the purposes of demonstrating compliance with national renewable energy obligations placed on operators, the contribution made by biofuels produced from wastes, residues, non-food cellulosic material, and ligno-cellulosic material shall be considered to be twice that made by other biofuels.

Article 19

Reporting by the Member States

1. Member States shall submit a report to the Commission on progress in the promotion and use of energy from renewable sources by 30 June 2011 at the latest, and every 2 years thereafter.

The report shall detail in particular:

- (a) the sectoral and overall shares of energy from renewable sources in the preceding two calendar years and the measures taken or planned at national level to promote the growth of renewable energy taking into account the indicative trajectory in Part B of Annex 1;
 - (b) the introduction and functioning of support schemes and other measures to promote energy from renewable sources, and any developments in the measures used with respect to those set out in the Member State's national action plan;
 - (c) how, where applicable, Member States have structured their support schemes to take into account renewable energy applications that give additional benefits in relation to other, comparable applications, but may also have higher costs, including biofuels made from wastes, residues, non-food cellulosic material, and ligno-cellulosic material;
 - (d) the functioning of the system of guarantees of origin for electricity and heating and cooling from renewable energy sources and the measures taken to ensure the reliability and protection against fraud of the system;
 - (e) progress made in evaluating and improving administrative procedures to remove regulatory and non-regulatory barriers to the development of energy from renewable sources;
 - (f) measures taken to ensure the transmission and distribution of electricity produced from renewable energy sources, and to improve the framework or rules for bearing and sharing of costs referred to in Article 14(3);
 - (g) developments in the availability and use of biomass resources for energy purposes;
 - (h) commodity price and land use changes within the Member State associated with its increased use of biomass and other forms of energy from renewable sources;
 - (i) the development and share of biofuels made from wastes, residues, non-food cellulosic material, and ligno-cellulosic material;
 - (j) the estimated impact of biofuel production on biodiversity, water resources, water quality and soil quality; and
 - (k) the estimated net greenhouse gas savings due to the use of energy from renewable sources.
2. In estimating net greenhouse gas savings from the use of biofuels, Member States may, for the purpose of the reports referred to in paragraph 1, use the typical values given in Annex VII, part A and part B.
 3. In their first report, Member States shall outline whether they intend to:

- (a) establish a single administrative body responsible for processing authorisation, certification and licensing applications for renewable energy installations and providing assistance to applicants;
- (b) provide for automatic approval of planning and permit applications for renewable energy installations where the authorising body has not responded within the set time limits; and
- (c) indicate geographical locations suitable for exploitation of energy from renewable sources in land-use planning and for the establishment of district heating and cooling.

Article 20

Monitoring and reporting by the Commission

1. The Commission shall monitor the origin of biofuels and other bioliquids consumed in the Community and the impacts of their production on land use in the Community and the main third countries of supply. Monitoring shall be based on Member States' reports, submitted pursuant to Article 19(1) and those of relevant third countries, intergovernmental organisations, scientific studies and any other relevant pieces of information. The Commission shall also monitor the commodity price changes associated with the use of biomass for energy and any associated positive and negative effects on food security.
2. The Commission shall maintain a dialogue and exchange information with third countries and biofuel producer and consumer organisations concerning the general implementation of the measures in this Directive relating to biofuels and other bioliquids.
3. On the basis of the reports submitted by Member States pursuant to Article 19(1) and the monitoring and analysis referred to in paragraph 1 of this Article, the Commission shall report every two years to the European Parliament and the Council. The first report shall be submitted in 2012.
4. In reporting on greenhouse gas savings from the use of biofuels, the Commission shall use the values reported by Member States and shall evaluate whether and how the estimate would change if co-products were accounted for using the substitution approach.
5. In its reports, the Commission shall analyse:
 - (a) the relative environmental benefits and costs of different biofuels, the effects of the Community's import policies thereon, the security of supply implications and the ways of achieving a balanced approach between domestic production and imports;
 - (b) the impact of increased demand for biofuel on sustainability in the Community and in third countries;

- (c) the impact of EU biofuel policy on the availability of foodstuffs in exporting countries, the ability of people in developing countries to afford these foodstuffs, and wider development issues; and
- (d) the impact of increased demand for biomass on biomass using sectors.

It shall, if appropriate, propose corrective action.

Article 21
Committee

1. The Commission shall be assisted by a Committee.
2. Where reference is made to this paragraph, Articles 3 and 7 of Decision 1999/468/EC shall apply, having regard to the provisions of Article 8 thereof.
3. Where reference is made to this paragraph, Articles 5a(1) to (4) and Article 7 of Decision 1999/468/EC shall apply, having regard to the provisions of Article 8 thereof.

Article 22
Amendments and repeal

1. In Directive 2001/77/EC, Article 2, Article 3(2), and Articles 4 to 8 are deleted with effect from 1 April 2010.
2. In Directive 2003/30/EC, Article 2, Article 3(2), (3) and (5), and Articles 5 and 6 are deleted with effect from 1 April 2010.
3. Directives 2001/77/EC and 2003/30/EC are repealed with effect from 1 January 2012.

Article 23
Transposition

1. Member States shall bring into force the laws, regulations and administrative provisions necessary to comply with this Directive by 31 March 2010 at the latest. They shall forthwith communicate to the Commission the text of those provisions and a correlation table between those provisions and this Directive.

When Member States adopt those provisions, they shall contain a reference to this Directive or be accompanied by such a reference on the occasion of their official publication. Member States shall determine how such reference is to be made.

2. Member States shall communicate to the Commission the text of the main provisions of national law which they adopt in the field covered by this Directive.

Article 24
Entry into force

This Directive shall enter into force on the twentieth day following that of its publication in the *Official Journal of the European Union*.

Article 25
Addressees

This Directive is addressed to the Member States.

Done at Brussels,

For the European Parliament
The President

For the Council
The President

Annex I – National overall targets for the share of energy from renewable sources in final consumption of energy in 2020

A. National overall targets

	Share of energy from renewable sources in final consumption of energy, 2005 (S₂₀₀₅)	Target for share of energy from renewable sources in final consumption of energy, 2020 (S₂₀₂₀)
Belgium	2.2%	13%
Bulgaria	9.4%	16%
The Czech Republic	6.1%	13%
Denmark	17.0%	30%
Germany	5.8%	18%
Estonia	18.0%	25%
Ireland	3.1%	16%
Greece	6.9%	18%
Spain	8.7%	20%
France	10.3%	23%
Italy	5.2%	17%
Cyprus	2.9%	13%
Latvia	34.9%	42%
Lithuania	15.0%	23%
Luxembourg	0.9%	11%
Hungary	4.3%	13%
Malta	0.0%	10%
The Netherlands	2.4%	14%
Austria	23.3%	34%
Poland	7.2%	15%
Portugal	20.5%	31%
Romania	17.8%	24%
Slovenia	16.0%	25%
The Slovak Republic	6.7%	14%
Finland	28.5%	38%
Sweden	39.8%	49%
United Kingdom	1.3%	15%

B. Indicative trajectory

The indicative trajectory referred to in Article 3(2) shall respect the following shares of energy from renewable sources:

$S_{2005} + 0.25 (S_{2020} - S_{2005})$, as an average for the two-year period 2011 to 2012;

$S_{2005} + 0.35 (S_{2020} - S_{2005})$, as an average for the two-year period 2013 to 2014;

$S_{2005} + 0.45 (S_{2020} - S_{2005})$, as an average for the two-year period 2015 to 2016; and

$S_{2005} + 0.65 (S_{2020} - S_{2005})$, as an average for the two-year period 2017 to 2018,

where

S_{2005} = the share for that Member State in 2005 as indicated in the table in Part A,

and

S_{2020} = the share for that Member State in 2020 as indicated in the table in Part A.

Annex II – Normalisation rule for accounting for electricity generated from hydropower

The following rule shall be applied for the purpose of accounting for electricity generated from hydropower in a given Member State:

$$Q_{N(norm)} = C_N * \left[\sum_{i=N-14}^N \frac{Q_i}{C_i} \right] / 15$$

where

N = reference year;

$Q_{N(norm)}$ = normalised electricity generated by all hydropower plants of the Member State in year N , for accounting purposes;

Q_i = the quantity of electricity actually generated in year i by all plants of the Member State measured in GWh;

C_i = the total installed capacity of all the plants of the Member State in year i , measured in MW.

Annex III – Energy content of transport fuels

Fuel	Energy content by weight (lower calorific value, MJ/kg)	Energy content by volume (lower calorific value, MJ/l)
Bioethanol (ethanol produced from biomass)	27	21
Bio-ETBE (ethyl-tertio-butyl-ether produced on the basis of bioethanol)	36 (of which 37% from renewable sources)	27 (of which 37% from renewable sources)
Biomethanol (methanol produced from biomass, to be used as biofuel)	20	16
Bio-MTBE (methyl-tertio-butyl-ether produced on the basis of bio-methanol)	35 (of which 22% from renewable sources)	26 (of which 22% from renewable sources)
Bio-DME (dimethylether produced from biomass, to be used as biofuel)	28	19
Bio-TAEE (tertiary-amyl-ethyl-ether produced on the basis of bioethanol)	38 (of which 29% from renewable sources)	29 (of which 29% from renewable sources)
Biobutanol (butanol produced from biomass, to be used as biofuel)	33	27
Biodiesel (methyl-ester produced from vegetable or animal oil, of diesel quality, to be used as biofuel)	37	33
Fischer-Tropsch diesel (a synthetic hydrocarbon or mixture of synthetic hydrocarbons produced from biomass)	44	34
Hydrotreated vegetable oil (vegetable oil thermochemically treated with hydrogen)	44	34
Pure vegetable oil (oil produced from oil plants through pressing, extraction or comparable procedures, crude or refined but chemically unmodified, when compatible with the type of engines involved and the corresponding emission requirements)	37	34
Biogas (a fuel gas produced from biomass and/or from the biodegradable fraction of waste, that can be purified to natural gas quality, to be used as biofuel, or woodgas)	50	-
Petrol	43	32
Diesel	43	36

Annex IV - Certification of installers

The criteria referred to in Article 13(3) shall be as follows:

1. The certification process shall be transparent and clearly defined by the Member State or the administrative body they appoint.
2. Biomass, heat pump and solar photovoltaic and solar thermal installers shall be certified by an accredited training programme or training provider.
3. The accreditation of the training programme or provider shall be done by Member States or administrative bodies they appoint. The accrediting body shall ensure that the training programme offered by the training provider has continuity and regional or national coverage. The training provider shall have adequate technical facilities to provide practical training, including some laboratory equipment or corresponding facilities to provide practical training. The training provider shall also offer in addition to the basic training, shorter refresher courses on topical issues, including on new technologies, to enable life-long learning in installations. The training provider may be the manufacturer of the equipment or system, institutes or associations.
4. Accredited training programmes shall be offered to installers with working experience, who have undergone, or are undergoing, the following types of training:
 - a) in the case of biomass boiler and stove installers: training as a plumber, pipe fitter, heating engineer or technician of sanitary and heating or cooling equipment as a prerequisite.
 - b) in the case of heat pump installers: training as a plumber or refrigeration engineer and have basic electrical and plumbing skills (cutting pipe, soldering pipe joints, gluing pipe joints, lagging, sealing fittings, testing for leaks and installation of heating or cooling systems) as a prerequisite;
 - c) in the case of a solar photovoltaic or solar thermal installer: training as a plumber, electrician, and have plumbing, electrical and roofing skills, including knowledge of soldering pipe joints, gluing pipe joints, sealing fittings, testing for plumbing leaks, ability to connect wiring, familiar with basic roof materials, flashing and sealing methods as a prerequisite; or
 - d) a vocational training scheme to provide an installer with adequate skills corresponding to a 3 years education in the skills referred to in point (a), (b) or (c) including both classroom and workplace learning.
5. The training leading to installer certification shall include both theoretical and practical parts. At the end of the training, the installer must have the skills required to install the relevant equipments and systems to meet the performance and reliability needs of the customer, incorporate quality craftsmanship, and comply with all applicable codes and standards, including energy and eco-labelling.
6. The theoretical part of the biomass stove and boiler installer training shall cover the market situation of biomass, ecological aspects, biomass fuels, logistics, building laws, fire protection, subsidies, combustion techniques, firing systems, optimal

hydraulic solutions, cost and profitability comparison as well as the design, installation, and maintenance of biomass boilers and stoves. The training shall also provide good knowledge of any European standards for technology and biomass fuels, such as pellets, and biomass related national and European legislation.

7. The theoretical part of the heat pump installer training shall cover market situation for heat pumps, geothermal resources and ground source temperatures of different regions, soil and rock identification for thermal conductivity, logistics, building laws, regulations on using geothermal resources, feasibility of using heat pumps in buildings and determining the most suitable heat pump system, and knowledge about their technical requirements, safety, air filtering, connection with the heat source and system layout. The training shall also provide good knowledge of any European standards for heat pumps, national and of relevant national and European legislation. The installer shall demonstrate the following key competences:
 - a) basic understanding of the physical and operation principles of a heat pump, including characteristics of the heat pump circle: context between low temperatures of the heat sink, high temperatures of the heat source, and the efficiency of the system, determination of the coefficient of performance (COP) and seasonal performance factor (SPF);
 - b) understanding of the components and their function within a heat pump circle, including the compressor, expansion valve, evaporator, condenser, fixtures and fittings, lubricating oil, refrigerant, superheating and sub-cooling and cooling possibilities with heat pumps;
 - c) ability to choose and size the components in typical installation situations, including determining the typical values of the heat load of different buildings and for hot water production based on energy consumption, determining the capacity of the heat pump on the heat load for hot water production, on the storage mass of the building and on interruptible current supply; determine buffer tank component and its volume and integration of a second heating system;
8. The theoretical part of the solar photovoltaic and solar thermal installer training shall cover the market situation of solar products, ecological aspects, components, characteristics and dimensioning of solar systems, selection of accurate systems and dimensioning of components, determination of the heat demand, logistics, building laws, fire protection, subsidies, cost and profitability comparison as well as the design, installation, and maintenance of solar photovoltaic and solar thermal installations. The training shall also provide good knowledge of any European standards for technology, and certification such as Solar Keymark, and related national and European legislation. The installer shall demonstrate the following key competences:
 - a) ability to work safely using the required tools and equipment and implementing safety codes and standards and identify plumbing, electrical and other hazards associated with solar installations;

- b) ability to identify systems and their components specific to active and passive systems, including the mechanical design, and determine the components' location and system layout and configuration;
 - c) ability to determine the required installation area, orientation and tilt for the solar photovoltaic and solar water heater, taking account of shading, solar access, structural integrity, the appropriateness of the installation for the building or the climate and identify different installation methods suitable for roof types and the balance of system equipment required for the installation;
 - d) for solar photovoltaic systems in particular, ability to adapt the electrical design, including determining design currents, selecting appropriate conductor types and ratings for each electrical circuit, determining appropriate size, ratings and locations for all associated equipment and subsystems and selecting an appropriate interconnection point.
9. The training course shall end with an examination leading to a certificate. The examination shall include a practical assessment of successfully installing biomass boilers or stoves, heat pumps, solar photovoltaic or solar thermal installations.
10. The installer certification shall be time restricted, so that a refresher seminar or event would be necessary for continued certification.

Annex V – Specifications for a 7% blend of biodiesel in diesel

Parameter	Units	Limits		
		Minimum	Maximum	
Measured cetene		51	-	
Calculated cetane		46	-	
Density at 15°C	kg/m ³	820	845	
Polycyclic aromatic hydrocarbons	%wt	-	8	
Sulphur content	mg/kg	-	10	
Flash point	°C	>55	-	
Carbon residue in 10% distillation residue	%	-	0.3	
Ash content	mg/kg	-	0.01	
Water content	mg/kg	-	200	
Total contamination	mg/kg	-	24	
Copper strip corrosion (3h-50°C)	cotation	class 1		
Lubricity EN ISO 12156-1	µm	-	460	
Kinematic viscosity at 40°C	mm ² /s	2	4.5	
Distillation	% recovery at 250°C	%	-	<65
	% recovery at 350°C	%	85	-
	Temperature for 95% recovery	°C	-	360
FAME content EN14078	%	0	7	
Cloud point	°C	Ref. national standard		
Cold filter plugging point	°C	Ref. national standard		
Oxidation stability - EN14112	h	20	-	
Oxidation stability by ASTM D2274 at 115°C	g/m ³	25		
Additivation for stability	Anti-oxidant equivalent to BHT at 1000ppm			

Annex VI – Specifications for a 10% blend of biodiesel in diesel

Parameter	Units	Limits	
		Minimum	Maximum
Measured cetene		51	-
Calculated cetane		46	-
Density at 15°C	kg/m ³	820	845
Polycyclic aromatic hydrocarbons	%wt	-	8
Sulphur content	mg/kg	-	10
Flash point	°C	>55	-
Carbon residue in 10% distillation residue	%	-	0.3
Ash content	mg/kg	-	0.01
Water content	mg/kg	-	200
Total contamination	mg/kg	-	24
Copper strip corrosion (3h-50°C)	cotation	class 1a	
Lubricity EN ISO 12156-1	µm	-	460
Kinematic viscosity at 40°C	mm ² /s	2	4.5
Distillation	% recovery at 250°C	%	-
	% recovery at 350°C	%	85
	Temperature for 95% recovery	°C	-
FAME content EN14078	%	5	10
Cloud point	°C	Ref. national standard	
Cold filter plugging point	°C	Ref. national standard	
Phosphorus content	mg/kg	-	0.2
Acid index	mgKOH/g	-	0.05
Peroxides EN ISO 3960		-	20
Oxidation stability - EN14112	h	20	-
Oxidation stability by ASTM D2274 at 115°C	g/m ³		25
Acid index variation	mgKOH/g		0.12
Injector fouling	Detergent additive package		
Additivation for stability	Anti-oxidant equivalent to BHT at 1000ppm		

Annex VII – Rules for calculating the greenhouse gas impact of biofuels, other bioliquids and their fossil fuel comparators

A. Typical and default values for biofuels if produced with no net carbon emissions from land use change

biofuel production pathway	typical greenhouse gas emission saving	default greenhouse gas emission saving
sugar beet ethanol	48%	35%
wheat ethanol (process fuel not specified)	21%	0%
wheat ethanol (lignite as process fuel in CHP plant)	21%	0%
wheat ethanol (natural gas as process fuel in conventional boiler)	45%	33%
wheat ethanol (natural gas as process fuel in CHP plant)	54%	45%
wheat ethanol (straw as process fuel in CHP plant)	69%	67%
corn (maize) ethanol, Community produced (natural gas as process fuel in CHP plant)	56%	49%
sugar cane ethanol	74%	74%
the part from renewable sources of ETBE (ethyl-tertio-butyl-ether)	Equal to that of the ethanol production pathway used	
the part from renewable sources of TAAE (tertiary-amyl-ethyl-ether)	Equal to that of the ethanol production pathway used	
rape seed biodiesel	44%	36%
sunflower biodiesel	58%	51%
palm oil biodiesel (process not specified)	32%	16%
palm oil biodiesel (process with no methane emissions to air at oil mill)	57%	51%
waste vegetable or animal oil biodiesel	83%	77%
Hydrotreated vegetable oil from rape seed	49%	45%
Hydrotreated vegetable oil from sunflower	65%	60%
Hydrotreated vegetable oil from palm oil (process not specified)	38%	24%
Hydrotreated vegetable oil from palm oil (process with no methane emissions to air at oil mill)	63%	60%
pure vegetable oil from rape seed	57%	55%
biogas from municipal organic waste as compressed natural gas	81%	75%
biogas from wet manure as compressed natural gas	86%	83%
biogas from dry manure as compressed natural gas	88%	85%

B. Estimated typical and default values for future biofuels that are not or in negligible quantities on the market in January 2008, if produced with no net carbon emissions from land use change

biofuel production pathway	typical greenhouse gas emission saving	default greenhouse gas emission saving
wheat straw ethanol	87%	85%
waste wood ethanol	80%	74%
farmed wood ethanol	76%	70%
waste wood Fischer-Tropsch diesel	95%	95%
farmed wood Fischer-Tropsch diesel	93%	93%
waste wood DME (dimethylether)	95%	95%
farmed wood DME (dimethylether)	92%	92%
waste wood methanol	94%	94%
farmed wood methanol	91%	91%
the part from renewable sources of MTBE (methyl-tertio-butyl-ether)l	Equal to that of the methanol production pathway used	

C. Methodology

1. Greenhouse gas emissions from the production and use of transport fuels, biofuels and other bioliquids shall be calculated as:

$$E = e_{ec} + e_l + e_p + e_{td} + e_u - e_{ccs} - e_{ccr} - e_{ee},$$

where

E = total emissions from the use of the fuel;

e_{ec} = emissions from the extraction or cultivation of raw materials;

e_l = annualised emissions from carbon stock changes caused by land use change;

e_p = emissions from processing;

e_{td} = emissions from transport and distribution;

e_u = emissions from the fuel in use;

e_{ccs} = emission savings from carbon capture and sequestration;

e_{ccr} = emission savings from carbon capture and replacement; and

e_{ee} = emission savings from excess electricity from cogeneration.

Emissions from the manufacture of machinery and equipment shall not be taken into account.

2. Greenhouse gas emissions from fuels, E , shall be expressed in terms of grams of CO₂ equivalent per MJ of fuel, gCO_{2eq}/MJ.
3. In exception to paragraph 2, for transport fuels, values calculated in terms of gCO_{2eq}/MJ may be adjusted to take into account differences between fuels in useful work done, expressed in terms of km/MJ. Such adjustments shall only be made where evidence of the differences in useful work done is provided.
4. Greenhouse gas emission savings from biofuels and other bioliquids shall be calculated as:

$$SAVING = (E_F - E_B)/E_F,$$

where

E_B = total emissions from the biofuel or other bioliquid; and

E_F = total emissions from the fossil fuel comparator.

5. The greenhouse gases taken into account for the purposes of paragraph 1 shall be CO₂, N₂O and CH₄. For the purpose of calculating CO₂ equivalence, these gases shall be valued as follows:

CO₂: 1

N₂O: 296

CH₄: 23

6. Emissions from the extraction or cultivation of raw materials, e_{ec} , shall include emissions from the extraction or cultivation process itself; from the collection of raw materials; from waste and leakages; and from the production of chemicals or products used in extraction or cultivation. Capture of CO₂ in the cultivation of raw materials shall be excluded. Certified reductions of greenhouse gas emissions from flaring at oil production sites anywhere in the world shall be deducted. Estimates of emissions from cultivation may be derived from the use of averages calculated for smaller geographical areas than those used in the calculation of the default values, as an alternative to using actual values.
7. Annualised emissions from carbon stock changes caused by land use change, e_l , shall be calculated by dividing total emissions equally over 20 years. For the calculation of these emissions the following rule shall be applied:

$$e_l = (CS_R - CS_A) \times MW_{CO_2} / MW_C \times 1/20 \times 1/P,$$

where

e_l = annualised greenhouse gas emissions from carbon stock change due to land use change (measured as mass of CO₂-equivalent per unit biofuel energy);

CS_R = the carbon stock per unit area associated with the reference land use (measured as mass of carbon per unit area, including both soil and vegetation). The reference land use shall be the land use in January 2008 or 20 years before the raw material was obtained, whichever was the latest;

CS_A = the carbon stock per unit area associated with the actual land use (measured as mass of carbon per unit area, including both soil and vegetation);

MW_{CO_2} = molecular weight of CO₂ = 44.010 g/mol;

MW_C = molecular weight of carbon = 12.011 g/mol; and

P = the productivity of the crop (measured as biofuel or other bioliquid energy per unit area per year).

8. For the purposes of paragraph 7, the following values may be used for both CS_R and CS_A

land use	carbon stock (tons of carbon per hectare)
oil palm plantation	189
permanent grassland, that is to say, rangelands and pasture land which have been under grassland vegetation and pasture use for at least 5 years and are not forested	181
lightly forested area (forest that is not continuously forested area)	181
arable (including grassland not considered as permanent; plantation of tree borne oil seeds; land that has been set aside in accordance with Article 2(1) of Commission Regulation (EC) No 796/2004 ¹⁹ and land that was tropical forest, was cleared before January 2008, and had the status of abandoned land in January 2008)	82
desert and semidesert	44

Alternatively, actual values may be used for both CS_R and CS_A .

The following values may be used to calculate P :

biofuel or other bioliquid crop	biofuel or other bioliquid yield (tons of oil equivalent per hectare)
tree borne oil seeds	1.5
oil palm	4.0

Alternatively, actual values may be used.

9. Emissions from processing, e_p , shall include emissions from the processing itself; from waste and leakages; and from the production of chemicals or products used in processing.

In accounting for the consumption of electricity not produced within the fuel production plant, the greenhouse gas emission intensity of the production and distribution of that electricity shall be assumed to be equal to the average emission intensity of the production and distribution of electricity in a defined region. In exception to this rule:

- a) producers may use an average value for an individual electricity production plant for electricity produced by that plant, if that plant is not connected to the electricity grid;
- b) producers may ascribe an emissions intensity of zero to each MWh of consumed electricity for which they transfer a guarantee of origin to a competent body in accordance with the provisions of Article 8, paragraph 1(c).

¹⁹ Commission Regulation (EC) No 796/2004 of 21 April 2004 laying down detailed rules for the implementation of cross-compliance, modulation and the integrated administration and control system provided for in of Council Regulation (EC) No 1782/2003 establishing common rules for direct support schemes under the common agricultural policy and establishing certain support schemes for farmers (OJ L 141, 30.4.2004, p. 18).

10. Emissions from transport and distribution, e_{td} , shall include emissions from the transport and storage of raw and semi-finished materials and from the storage and distribution of finished materials.
11. Emissions from the fuel in use, e_u , shall be taken to be zero for biofuels and other bioliquids.
12. Emission savings from carbon capture and sequestration, e_{ccs} , shall be limited to emissions avoided through the capture and sequestration of emitted CO₂ directly related to the extraction, transport, processing and distribution of fuel.
13. Emission savings from carbon capture and replacement, e_{ccr} , shall be limited to emissions avoided through the capture of CO₂ of which the carbon originates from biomass and which is used to replace fossil-derived CO₂ used in commercial products and services.
14. Emission savings from excess electricity from cogeneration, e_{ee} , shall be taken into account in relation to the excess electricity produced by fuel production systems that use cogeneration except where the fuel used for the cogeneration is a co-product other than an agricultural crop residue. In accounting for this excess electricity, the size of the cogeneration unit shall be assumed to be the minimum necessary for the cogeneration unit to supply the heat that is needed to produce the fuel. The greenhouse gas emission savings associated with this excess electricity shall be taken to be equal to the amount of greenhouse gas that would be emitted when an equal amount of electricity was generated in a power plant using the same fuel as the cogeneration unit.
15. Where a fuel production process produces, in combination, the fuel for which emissions are being calculated and one or more other products ("co-products"), greenhouse gas emissions shall be divided between the fuel or its intermediate product and the co-products in proportion to their energy content (determined by lower heating value in the case of co-products other than electricity).
16. For the purposes of the calculation referred to in paragraph 15, the emissions to be divided shall be $e_{ec} + e_l$, + those fractions of e_p , e_{td} and e_{ee} that take place up to and including the process step at which a co-product is produced. If any allocation to co-products has taken place at an earlier process step in the life-cycle, the fraction of those emissions assigned in the last such process step to the intermediate fuel product shall be used for this purpose instead of the total of those emissions.

In the case of biofuels and other bioliquids, all co-products, including electricity that does not fall under the scope of paragraph 14, shall be taken into account for the purposes of this calculation, except for agricultural crop residues, including straw, bagasse, husks, cobs and nut shells. Co-products that have a negative energy content shall be considered to have an energy content of zero for the purpose of the calculation.

Wastes, agricultural crop residues, including straw, bagasse, husks, cobs and nut shells, and residues from processing chains, other than biofuel processing chains, with no potential food or feed use shall be considered to have zero life-cycle greenhouse gas emissions up to the process of collection of these materials.

In the case of fuels produced in refineries, the unit of analysis for the purposes of the calculation referred to in paragraph 15 shall be the refinery.

17. For biofuels, for the purposes of the calculation referred to in paragraph 4, the fossil fuel comparator E_F shall be the latest available actual average emissions from petrol and diesel consumed in the Community as reported under [Directive 98/70/EC]. If no such data are available, the value used shall be 83.8 gCO_{2eq}/MJ.

For bioliquids used for electricity production, for the purposes of the calculation referred to in paragraph 4, the fossil fuel comparator E_F shall be 91 gCO_{2eq}/MJ.

For bioliquids used for heat production, for the purposes of the calculation referred to in paragraph 4, the fossil fuel comparator E_F shall be 77 gCO_{2eq}/MJ.

For bioliquids used for cogeneration, for the purposes of the calculation referred to in paragraph 4, the fossil fuel comparator E_F shall be 85 gCO_{2eq}/MJ.

D. Disaggregated values for biofuels and bioliquids

Cultivation: ' e_{ec} ' as defined in Part C of this Annex

biofuel and other bioliquid production pathway	Typical greenhouse gas emissions (gCO_{2eq}/MJ)	Default greenhouse gas emissions (gCO_{2eq}/MJ)
sugar beet ethanol	13	13
wheat ethanol	19	19
corn (maize) ethanol, Community produced	20	20
sugar cane ethanol	13	13
the part from renewable sources of ETBE (ethyl-tertio-butyl-ether)	Equal to that of the ethanol production pathway used	
the part from renewable sources of TAEE (tertiary-amyl-ethyl-ether)	Equal to that of the ethanol production pathway used	
rape seed biodiesel	30	30
sunflower biodiesel	18	18
palm oil biodiesel	18	18
waste vegetable or animal oil biodiesel	0	0
Hydrotreated vegetable oil from rape seed	31	31
Hydrotreated vegetable oil from sunflower	19	19
Hydrotreated vegetable oil from palm oil	19	19
pure vegetable oil from rape seed	32	32
biogas from municipal organic waste as compressed natural gas	0	0
biogas from wet manure as compressed natural gas	0	0
biogas from dry manure as compressed natural gas	0	0

Processing (including excess electricity): ' $e_p - e_{ee}$ ' as defined in Part C of this Annex

biofuel and other bioliquid production pathway	Typical greenhouse gas emissions (gCO_{2eq}/MJ)	Default greenhouse gas emissions (gCO_{2eq}/MJ)
sugar beet ethanol	27	38
wheat ethanol (process fuel not specified)	45	63
wheat ethanol (lignite as process fuel in CHP plant)	45	63
wheat ethanol (natural gas as process fuel in conventional boiler)	25	35
wheat ethanol (natural gas as process fuel in CHP plant)	18	25
wheat ethanol (straw as process fuel in CHP plant)	5	7
corn (maize) ethanol, Community produced (natural gas as process fuel in CHP plant)	15	21
sugar cane ethanol	1	1
the part from renewable sources of ETBE (ethyl-tertio-butyl-ether)	Equal to that of the ethanol production pathway used	
the part from renewable sources of TAEE (tertiary-amyl-ethyl-ether)	Equal to that of the ethanol production pathway used	
rape seed biodiesel	15	22

sunflower biodiesel	15	22
palm oil biodiesel (process not specified)	33	47
palm oil biodiesel (process with no methane emissions to air at the oil mill)	13	18
waste vegetable or animal oil biodiesel	13	18
Hydrotreated vegetable oil from rape seed	10	14
Hydrotreated vegetable oil from sunflower	10	14
Hydrotreated vegetable oil from palm oil (process not specified)	28	40
Hydrotreated vegetable oil from palm oil (process with no methane emissions to air at the oil mill)	7	10
pure vegetable oil from rape seed	4	5
biogas from municipal organic waste as compressed natural gas	13	18
biogas from wet manure as compressed natural gas	7	9
biogas from dry manure as compressed natural gas	7	9

Transport and distribution: ' e_{td} ' as defined in Part C of this Annex

biofuel and other bioliquid production pathway	Typical greenhouse gas emissions (gCO_{2eq}/MJ)	Default greenhouse gas emissions (gCO_{2eq}/MJ)
sugar beet ethanol	3	3
wheat ethanol	2	2
corn (maize) ethanol, Community produced	2	2
sugar cane ethanol	8	8
the part from renewable sources of ETBE (ethyl-tertio-butyl-ether)	Equal to that of the ethanol production pathway used	
the part from renewable sources of TAAE (tertiary-amyl-ethyl-ether)	Equal to that of the ethanol production pathway used	
rape seed biodiesel	1	1
sunflower biodiesel	1	1
palm oil biodiesel	5	5
waste vegetable or animal oil biodiesel	1	1
Hydrotreated vegetable oil from rape seed	1	1
Hydrotreated vegetable oil from sunflower	1	1
Hydrotreated vegetable oil from palm oil	5	5
pure vegetable oil from rape seed	1	1
biogas from municipal organic waste as compressed natural gas	3	3
biogas from wet manure as compressed natural gas	5	5
biogas from dry manure as compressed natural gas	4	4

Total

biofuel and other bioliquid production pathway	Typical greenhouse gas emissions (gCO_{2eq}/MJ)	Default greenhouse gas emissions (gCO_{2eq}/MJ)
sugar beet ethanol	43	54
wheat ethanol (process fuel not specified)	66	84
wheat ethanol (lignite as process fuel in CHP plant)	66	84
wheat ethanol (natural gas as process fuel in conventional boiler)	46	56
wheat ethanol (natural gas as process fuel in CHP plant)	39	46
wheat ethanol (straw as process fuel in CHP plant)	26	28
corn (maize) ethanol, Community produced (natural gas as process fuel in CHP plant)	37	43
sugar cane ethanol	21	22
the part from renewable sources of ETBE (ethyl-tertio-butyl-ether)	Equal to that of the ethanol production pathway used	
the part from renewable sources of TAAE (tertiary-amyl-ethyl-ether)	Equal to that of the ethanol production pathway used	
rape seed biodiesel	47	53
sunflower biodiesel	35	41
palm oil biodiesel (process not specified)	57	70
palm oil biodiesel (process with no methane emissions to air at the oil mill)	36	41
waste vegetable or animal oil biodiesel	14	19
Hydrotreated vegetable oil from rape seed	42	46
Hydrotreated vegetable oil from sunflower	30	34
Hydrotreated vegetable oil from palm oil (process not specified)	52	63
Hydrotreated vegetable oil from palm oil (process with no methane emissions to air at the oil mill)	31	34
pure vegetable oil from rape seed	36	38
biogas from municipal organic waste as compressed natural gas	16	21
biogas from wet manure as compressed natural gas	12	14
biogas from dry manure as compressed natural gas	10	13

E. Estimated disaggregated values for future biofuels and bioliquids that are not or in negligible quantities on the market in January 2008

Cultivation: ' e_{ec} ' as defined in Part C of this Annex

biofuel and other bioliquid production pathway	Typical greenhouse gas emissions (gCO _{2eq} /MJ)	Default greenhouse gas emissions (gCO _{2eq} /MJ)
wheat straw ethanol	3	3
waste wood ethanol	1	1
farmed wood ethanol	6	6
waste wood Fischer-Tropsch diesel	1	1
farmed wood Fischer-Tropsch diesel	4	4
waste wood DME (dimethylether)	1	1
farmed wood DME (dimethylether)	5	5
waste wood methanol	1	1
farmed wood methanol	5	5
the part from renewable sources of MTBE (methyl-tertio-butyl-ether)l	Equal to that of the methanol production pathway used	

Processing (including excess electricity): $e_p - e_{ee}$ ' as defined in Part C of this Annex

biofuel and other bioliquid production pathway	Typical greenhouse gas emissions (gCO _{2eq} /MJ)	Default greenhouse gas emissions (gCO _{2eq} /MJ)
wheat straw ethanol	5	7
wood ethanol	12	17
wood Fischer-Tropsch diesel	0	0
wood DME (dimethylether)	0	0
wood methanol	0	0
the part from renewable sources of MTBE (methyl-tertio-butyl-ether)l	Equal to that of the methanol production pathway used	

Transport and distribution: ' e_{td} ' as defined in Part C of this Annex

biofuel and other bioliquid production pathway	Typical greenhouse gas emissions (gCO _{2eq} /MJ)	Default greenhouse gas emissions (gCO _{2eq} /MJ)
wheat straw ethanol	2	2
waste wood ethanol	4	4
farmed wood ethanol	2	2
waste wood Fischer-Tropsch diesel	3	3
farmed wood Fischer-Tropsch diesel	2	2
waste wood DME (dimethylether)	4	4
farmed wood DME (dimethylether)	2	2
waste wood methanol	4	4
farmed wood methanol	2	2
the part from renewable sources of MTBE (methyl-tertio-butyl-ether)l	Equal to that of the methanol production pathway used	

Total

biofuel and other bioliquid production pathway	Typical greenhouse gas emissions (gCO_{2eq}/MJ)	Default greenhouse gas emissions (gCO_{2eq}/MJ)
wheat straw ethanol	11	13
waste wood ethanol	17	22
farmed wood ethanol	20	25
waste wood Fischer-Tropsch diesel	4	4
farmed wood Fischer-Tropsch diesel	6	6
waste wood DME (dimethylether)	5	5
farmed wood DME (dimethylether)	7	7
waste wood methanol	5	5
farmed wood methanol	7	7
the part from renewable sources of MTBE (methyl-tertio-butyl-ether)	Equal to that of the methanol production pathway used	