

Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC (Text with EEA relevance)

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PARLIAMENT AND OF THE COUNCIL

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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 in relation to Articles 17, 18 and 19 of this Directive,

Having regard to the proposal from the Commission,

Having regard to the opinion of the European Economic and Social Committee⁽¹⁾,

Having regard to the opinion of the Committee of the Regions⁽²⁾,

Acting in accordance with the procedure laid down in Article 251 of the Treaty⁽³⁾,

Whereas:

- (1) The control of European energy consumption and the increased use of energy from renewable sources, together with energy savings and increased energy efficiency, constitute important parts 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 Community and international greenhouse gas emission reduction commitments beyond 2012. Those factors also have an important part to play in promoting the security of energy supply, promoting technological development and innovation and providing opportunities for employment and regional development, especially in rural and isolated areas.
- (2) In particular, increasing technological improvements, incentives for the use and expansion of public transport, the use of energy efficiency technologies and the use of energy from renewable sources in transport are some of the most effective tools by which the Community can reduce its dependence on imported oil in the transport sector, in which the security of energy supply problem is most acute, and influence the fuel market for transport.
- (3) The opportunities for establishing economic growth through innovation and a sustainable competitive energy policy have been recognised. Production of energy

from renewable sources often depends on local or regional small and medium-sized enterprises (SMEs). The opportunities for growth and employment that investment in regional and local production of energy from renewable sources bring about in the Member States and their regions are important. The Commission and the Member States should therefore support national and regional development measures in those areas, encourage the exchange of best practices in production of energy from renewable sources between local and regional development initiatives and promote the use of structural funding in this area.

- (4) When favouring the development of the market for renewable energy sources, it is necessary to take into account the positive impact on regional and local development opportunities, export prospects, social cohesion and employment opportunities, in particular as concerns SMEs and independent energy producers.
- (5) In order to reduce greenhouse gas emissions within the Community and reduce its dependence on energy imports, the development of energy from renewable sources should be closely linked to increased energy efficiency.
- (6) It is appropriate to support the demonstration and commercialisation phase of decentralised renewable energy technologies. The move towards decentralised energy production has many benefits, including the utilisation of local energy sources, increased local security of energy supply, shorter transport distances and reduced energy transmission losses. Such decentralisation also fosters community development and cohesion by providing income sources and creating jobs locally.
- (7) 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 market⁽⁴⁾ 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 renewable fuels for transport⁽⁵⁾ established definitions for different types of energy from renewable sources. 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⁽⁶⁾ established definitions for the electricity sector in general. In the interests of legal certainty and clarity it is appropriate to use the same or similar definitions in this Directive.
- (8) The Commission communication of 10 January 2007 entitled ‘Renewable Energy Roadmap — Renewable energies in the 21st century: building a more sustainable future’ demonstrated that a 20 % target for the overall share of energy from renewable sources and a 10 % target for energy from renewable sources 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, sustainable investments in the renewable energy sector which are capable of reducing dependence on imported fossil fuels and boosting the use of new energy technologies. Those targets exist in the context of the 20 % improvement in energy efficiency by 2020 set out in the Commission communication of 19 October 2006 entitled ‘Action Plan for Energy Efficiency: Realising the Potential’, which was

endorsed by the European Council of March 2007, and by the European Parliament in its resolution of 31 January 2008 on that Action Plan.

- (9) The European Council of March 2007 reaffirmed the Community's commitment to the Community-wide development of energy from renewable sources beyond 2010. It endorsed a mandatory target of a 20 % share of energy from renewable sources 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⁽⁷⁾ being amended to allow for adequate levels of blending. The European Council of March 2008 repeated that it is essential to develop and fulfil effective sustainability criteria for biofuels and ensure the commercial availability of second-generation biofuels. The European Council of June 2008 referred again to the sustainability criteria and the development of second-generation biofuels, and underlined the need to assess the possible impacts of biofuel production on agricultural food products and to take action, if necessary, to address shortcomings. It also stated that further assessment should be made of the environmental and social consequences of the production and consumption of biofuels.
- (10) In its resolution of 25 September 2007 on the Road Map for Renewable Energy in Europe⁽⁸⁾, the European Parliament called on the Commission to present, by the end of 2007, a proposal for a legislative framework for energy from renewable sources, referring to the importance of setting targets for the shares of energy from renewable sources at Community and Member State level.
- (11) It is necessary to set transparent and unambiguous rules for calculating the share of energy from renewable sources and for defining those sources. In this context, the energy present in oceans and other water bodies in the form of waves, marine currents, tides, ocean thermal energy gradients or salinity gradients should be included.
- (12) The use of agricultural material such as manure, slurry and other animal and organic waste for biogas production has, in view of the high greenhouse gas emission saving potential, significant environmental advantages in terms of heat and power production and its use as biofuel. Biogas installations can, as a result of their decentralised nature and the regional investment structure, contribute significantly to sustainable development in rural areas and offer farmers new income opportunities.
- (13) In the light of the positions taken by the European Parliament, the Council and the Commission, it is appropriate to establish mandatory national targets consistent with a 20 % share of energy from renewable sources and a 10 % share of energy from renewable sources in transport in Community energy consumption by 2020.
- (14) The main purpose of mandatory national targets is to provide certainty for investors and to encourage continuous development of technologies which generate energy from all types of renewable sources. Deferring a decision about whether a target is mandatory until a future event takes place is thus not appropriate.

- (15) The starting point, the renewable energy potential and the energy mix of each Member State vary. It is therefore necessary to translate the Community 20 % target into individual targets for each Member State, with due regard to a fair and adequate allocation taking account of Member States' different starting points and potentials, including the existing level of energy from renewable sources and the 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 GDP, modulated to reflect their starting points, and by accounting in terms of gross final consumption of energy, with account being taken of Member States' past efforts with regard to the use of energy from renewable sources.
- (16) By contrast, it is appropriate for the 10 % target for energy from renewable sources 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 biofuels from elsewhere. While it would technically be possible for the Community to meet its target for the use of energy from renewable sources in transport 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, inter alia, the development of multilateral and bilateral trade negotiations, environmental, social and economic considerations, and the security of energy supply.
- (17) The improvement of energy efficiency is a key objective of the Community, and the aim is to achieve a 20 % improvement in energy efficiency by 2020. That aim, together with existing and future legislation including Directive 2002/91/EC of the European Parliament and of the Council of 16 December 2002 on the energy performance of buildings⁽⁹⁾, Directive 2005/32/EC of the European Parliament and of the Council of 6 July 2005 establishing a framework for the setting of ecodesign requirements for energy-using products⁽¹⁰⁾, and Directive 2006/32/EC of the European Parliament and of the Council of 5 April 2006 on energy end-use efficiency and energy services⁽¹¹⁾, has a critical role to play in ensuring that the climate and energy objectives are being achieved at least cost, and can also provide new opportunities for the European Union's economy. Energy efficiency and energy saving policies are some of the most effective methods by which Member States can increase the percentage share of energy from renewable sources, and Member States will thus more easily achieve the overall national and transport targets for energy from renewable sources laid down by this Directive.
- (18) It will be incumbent upon Member States to make significant improvements in energy efficiency in all sectors in order more easily to achieve their targets for energy from renewable sources, which are expressed as a percentage of gross final consumption of energy. The need for energy efficiency in the transport sector is imperative because a mandatory percentage target for energy from renewable sources is likely to become

increasingly difficult to achieve sustainably if overall demand for energy for transport continues to rise. The mandatory 10 % target for transport to be achieved by all Member States should therefore be defined as that share of final energy consumed in transport which is to be achieved from renewable sources as a whole, and not from biofuels alone.

- (19) To ensure that the mandatory national overall targets are achieved, Member States should work towards an indicative trajectory tracing a path towards the achievement of their final mandatory targets. They should establish a national renewable energy action plan including information on sectoral targets, while having in mind that there are different uses of biomass and therefore it is essential to mobilise new biomass resources. In addition, Member States should set out measures to achieve those targets. Each Member State should assess, when evaluating its expected gross final consumption of energy in its national renewable energy action plan, the contribution which energy efficiency and energy saving measures can make to achieving its national targets. Member States should take into account the optimal combination of energy efficiency technologies with energy from renewable sources.
- (20) To permit the benefits of technological progress 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 the future. Thus special attention can be given to sectors that suffer disproportionately from the absence of technological progress and economies of scale and therefore remain under-developed, but which, in future, could significantly contribute to reaching the targets for 2020.
- (21) The indicative trajectory should take 2005 as its starting point because that is the latest year for which reliable data on national shares of energy from renewable sources are available.
- (22) The achievement of the objectives of this Directive requires that the Community and Member States dedicate a significant amount of financial resources to research and development in relation to renewable energy technologies. In particular, the European Institute of Innovation and Technology should give high priority to the research and development of renewable energy technologies.
- (23) Member States may encourage local and regional authorities to set targets in excess of national targets and to involve local and regional authorities in drawing up national renewable energy action plans and in raising awareness of the benefits of energy from renewable sources.
- (24) In order to exploit the full potential of biomass, the Community and the Member States should promote greater mobilisation of existing timber reserves and the development of new forestry systems.
- (25) Member States have different renewable energy potentials and operate different schemes of support for energy from renewable sources at the national level. The majority of Member States apply support schemes that grant benefits solely to energy from renewable sources that is produced on their territory. For the proper functioning of national support schemes it is vital that Member States can control the effect and costs of their national support schemes according to their different potentials. One important

means to achieve the aim of this Directive is to guarantee the proper functioning of national support schemes, as under Directive 2001/77/EC, in order to maintain investor confidence and allow Member States to design effective national measures for target compliance. This Directive aims at facilitating cross-border support of energy from renewable sources without affecting national support schemes. It introduces optional cooperation mechanisms between Member States which allow them to agree on the extent to which one Member State supports the energy production in another and on the extent to which the energy production from renewable sources should count towards the national overall target of one or the other. In order to ensure the effectiveness of both measures of target compliance, i.e. national support schemes and cooperation mechanisms, it is essential that Member States are able to determine if and to what extent their national support schemes apply to energy from renewable sources produced in other Member States and to agree on this by applying the cooperation mechanisms provided for in this Directive.

- (26) It is desirable that energy prices reflect external costs of energy production and consumption, including, as appropriate, environmental, social and healthcare costs.
- (27) Public support is necessary to reach the Community's objectives with regard to the expansion of electricity produced from renewable energy sources, in particular for as long as electricity prices in the internal market do not reflect the full environmental and social costs and benefits of energy sources used.
- (28) The Community and the Member States should strive to reduce total consumption of energy in transport and increase energy efficiency in transport. The principal means of reducing consumption of energy in transport include transport planning, support for public transport, increasing the share of electric cars in production and producing cars which are more energy efficient and smaller both in size and in engine capacity.
- (29) Member States should aim to diversify the mix of energy from renewable sources in all transport sectors. The Commission should present a report to the European Parliament and the Council by 1 June 2015 outlining the potential for increasing the use of energy from renewable sources in each transport sector.
- (30) In calculating the contribution of hydropower and wind power for the purposes of this Directive, the effects of climatic variation should be smoothed through the use of a normalisation rule. Further, electricity produced in pumped storage units from water that has previously been pumped uphill should not be considered to be electricity produced from renewable energy sources.
- (31) Heat pumps enabling the use of aerothermal, geothermal or hydrothermal heat at a useful temperature level need electricity or other auxiliary energy to function. The energy used to drive heat pumps should therefore be deducted from the total usable heat. Only heat pumps with an output that significantly exceeds the primary energy needed to drive it should be taken into account.
- (32) Passive energy systems use building design to harness energy. This is considered to be saved energy. To avoid double counting, energy harnessed in this way should not be taken into account for the purposes of this Directive.

- (33) Some Member States have a large share of aviation in their gross final consumption of energy. In view of the current technological and regulatory constraints that prevent the commercial use of biofuels in aviation, it is appropriate to provide a partial exemption for such Member States, by excluding from the calculation of their gross final consumption of energy in national air transport, the amount by which they exceed one-and-a-half times the Community average gross final consumption of energy in aviation in 2005, as assessed by Eurostat, i.e. 6,18 %. Cyprus and Malta, due to their insular and peripheral character, rely on aviation as a mode of transport, which is essential for their citizens and their economy. As a result, Cyprus and Malta have a gross final consumption of energy in national air transport which is disproportionately high, i.e. more than three times the Community average in 2005, and are thus disproportionately affected by the current technological and regulatory constraints. For those Member States it is therefore appropriate to provide that the exemption should cover the amount by which they exceed the Community average gross final consumption of energy in aviation in 2005 as assessed by Eurostat, i.e. 4,12 %.
- (34) To obtain an energy model that supports energy from renewable sources there is a need to encourage strategic cooperation between Member States, involving, as appropriate, regions and local authorities.
- (35) Whilst having due regard to the provisions of this Directive, Member States should be encouraged to pursue all appropriate forms of cooperation in relation to the objectives set out in this Directive. Such cooperation can take place at all levels, bilaterally or multilaterally. Apart from the mechanisms with effect on target calculation and target compliance, which are exclusively provided for in this Directive, namely statistical transfers between Member States, joint projects and joint support schemes, cooperation can also take the form of, for example, exchanges of information and best practices, as provided for, in particular, in the transparency platform established by this Directive, and other voluntary coordination between all types of support schemes.
- (36) 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 to enable Member States to count energy from renewable sources consumed in other Member States towards their own national targets. For this reason, flexibility measures are required, but they remain under Member States' control in order not to affect their ability to reach their national targets. Those flexibility measures take the form of statistical transfers, joint projects between Member States or joint support schemes.
- (37) It should be possible for imported electricity, produced from renewable energy sources outside the Community, to 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 produced by renewable energy installations that become operational after the entry into force of this Directive or by the increased capacity of an installation that was refurbished after that date should be eligible to be counted. In order to guarantee an adequate effect of energy from renewable sources replacing conventional energy in the

Community as well as in third countries it is appropriate to ensure that such imports can be tracked and accounted for in a reliable way. Agreements with third countries concerning the organisation of such trade in electricity from renewable energy sources will be considered. If, by virtue of a decision taken under the Energy Community Treaty⁽¹²⁾ to that effect, the contracting parties to that treaty become bound by the relevant provisions of this Directive, the measures of cooperation between Member States provided for in this Directive will be applicable to them.

- (38) When Member States undertake joint projects with one or more third countries regarding the production of electricity from renewable energy sources, it is appropriate that those joint projects relate only to newly constructed installations or to installations with newly increased capacity. This will help ensure that the proportion of energy from renewable sources in the third country's total energy consumption is not reduced due to the importation of energy from renewable sources into the Community. In addition, the Member States concerned should facilitate the domestic use by the third country concerned of part of the production of electricity by the installations covered by the joint project. Furthermore, the third country concerned should be encouraged by the Commission and Member States to develop a renewable energy policy, including ambitious targets.
- (39) Noting that projects of high European interest in third countries, such as the Mediterranean Solar Plan, may need a long lead-time before being fully interconnected to the territory of the Community, it is appropriate to facilitate their development by allowing Member States to take into account in their national targets a limited amount of electricity produced by such projects during the construction of the interconnection.
- (40) The procedure used by the administration responsible for supervising the authorisation, certification and licensing of renewable energy plants should be objective, transparent, non-discriminatory and proportionate when applying the rules to specific projects. In particular, it is appropriate to avoid any unnecessary burden that could arise by classifying renewable energy projects under installations which represent a high health risk.
- (41) The lack of transparent rules and coordination between the different authorisation bodies has been shown to hinder the deployment of energy from renewable sources. 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 and associated transmission and distribution network infrastructures for the production of electricity, heating and cooling or transport fuels from renewable energy sources. Administrative approval procedures should be streamlined with transparent timetables 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.
- (42) For the benefit of rapid deployment of energy from renewable sources and in view of their overall high sustainable and environmental beneficial quality, Member States should, when applying administrative rules, planning structures and legislation which

are designed for licensing installations with respect to pollution reduction and control for industrial plants, for combating air pollution and for the prevention or minimisation of the discharge of dangerous substances in the environment, take into account the contribution of renewable energy sources towards meeting environmental and climate change objectives, in particular when compared to non-renewable energy installations.

- (43) In order to stimulate the contribution by individual citizens to the objectives set out in this Directive, the relevant authorities should consider the possibility of replacing authorisations by simple notifications to the competent body when installing small decentralised devices for producing energy from renewable sources.
- (44) The coherence between the objectives of this Directive and the Community's other environmental legislation should be ensured. In particular, during the assessment, planning or licensing procedures for renewable energy installations, Member States should take account of all Community environmental legislation and the contribution made by renewable energy sources towards meeting environmental and climate change objectives, in particular when compared to non-renewable energy installations.
- (45) 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 regulations and rules on Information Society services⁽¹³⁾, 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 energy from renewable sources should not prescribe national technical specifications which deviate from existing Community standards or require the supported equipment or systems to be certified or tested in a specified location or by a specified entity.
- (46) It is appropriate for Member States to consider mechanisms for the promotion of district heating and cooling from energy from renewable sources.
- (47) At national and regional level, rules and obligations for minimum requirements for the use of energy from renewable sources in new and renovated buildings have led to considerable increases in the use of energy from renewable sources. Those measures should be encouraged in a wider Community context, while promoting the use of more energy-efficient applications of energy from renewable sources through building regulations and codes.
- (48) It may be appropriate for Member States, in order to facilitate and accelerate the setting of minimum levels for the use of energy from renewable sources in buildings, to provide that such levels are achieved by incorporating a factor for energy from renewable sources in meeting minimum energy performance requirements under Directive 2002/91/EC, relating to a cost-optimal reduction of carbon emissions per building.
- (49) 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.

- (50) In so far as the access or pursuit of the profession of installer is a regulated profession, the preconditions for the recognition of professional qualifications are laid down in Directive 2005/36/EC of the European Parliament and of the Council of 7 September 2005 on the recognition of professional qualifications⁽¹⁴⁾. This Directive therefore applies without prejudice to Directive 2005/36/EC.
- (51) 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 an optimal combination of renewable energy sources and high-efficiency technologies in their plans and designs. Member States should therefore provide clear guidance in this regard. This should be done without prejudice to the provisions of Directive 2005/36/EC and in particular Articles 46 and 49 thereof.
- (52) Guarantees of origin issued for the purpose of this Directive have the sole function of proving to a final customer that a given share or quantity of energy was produced from renewable sources. A guarantee of origin can be transferred, independently of the energy to which it relates, from one holder to another. However, with a view to ensuring that a unit of electricity from renewable energy sources is disclosed to a customer only once, double counting and double disclosure of guarantees of origin should be avoided. Energy from renewable sources in relation to which the accompanying guarantee of origin has been sold separately by the producer should not be disclosed or sold to the final customer as energy from renewable sources. It is important to distinguish between green certificates used for support schemes and guarantees of origin.
- (53) It is appropriate to allow the emerging consumer market for electricity from renewable energy sources to contribute to the construction of new installations for energy from renewable sources. Member States should therefore be able to require electricity suppliers who disclose their energy mix to final customers in accordance with Article 3(6) of Directive 2003/54/EC, to include a minimum percentage of guarantees of origin from recently constructed installations producing energy from renewable sources, provided that such a requirement is in conformity with Community law.
- (54) It is important to provide information on how the supported electricity is allocated to final customers in accordance with Article 3(6) of Directive 2003/54/EC. In order to improve the quality of that information to consumers, in particular as regards the amount of energy from renewable sources produced by new installations, the Commission should assess the effectiveness of the measures taken by Member States.
- (55) Directive 2004/8/EC of the European Parliament and of the Council of 11 February 2004 on the promotion of cogeneration based on a useful heat demand in the internal energy market⁽¹⁵⁾ provides for guarantees of origin for proving the origin of electricity produced from high-efficiency cogeneration plants. Such guarantees of origin cannot be used when disclosing the use of energy from renewable sources in accordance with Article 3(6) of Directive 2003/54/EC as this might result in double counting and double disclosure.

- (56) Guarantees of origin do not by themselves confer a right to benefit from national support schemes.
- (57) There is a need to support the integration of energy from renewable sources into the transmission and distribution grid and the use of energy storage systems for integrated intermittent production of energy from renewable sources.
- (58) The development of renewable energy projects, including renewable energy projects of European interest under the Trans-European Network for Energy (TEN-E) programme should be accelerated. To that end, the Commission should also analyse how the financing of such projects can be improved. Particular attention should be paid to renewable energy projects that will contribute to a significant increase in security of energy supply in the Community and neighbouring countries.
- (59) Interconnection among countries facilitates integration of electricity from renewable energy sources. Besides smoothing out 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 need for newly built capacity.
- (60) Priority access and guaranteed access for electricity from renewable energy sources are important for integrating renewable energy sources into the internal market in electricity, in line with Article 11(2) and developing further Article 11(3) of Directive 2003/54/EC. Requirements relating to the maintenance of the reliability and safety of the grid and to the dispatching may differ according to the characteristics of the national grid and its secure operation. Priority access to the grid provides an assurance given to connected generators of electricity from renewable energy sources that they will be able to sell and transmit the electricity from renewable energy sources in accordance with connection rules at all times, whenever the source becomes available. In the event that the electricity from renewable energy sources is integrated into the spot market, guaranteed access ensures that all electricity sold and supported obtains access to the grid, allowing the use of a maximum amount of electricity from renewable energy sources from installations connected to the grid. However, this does not imply any obligation on the part of Member States to support or introduce purchase obligations for energy from renewable sources. In other systems, a fixed price is defined for electricity from renewable energy sources, usually in combination with a purchase obligation for the system operator. In such a case, priority access has already been given.
- (61) In certain circumstances it is not possible fully to ensure transmission and distribution of electricity produced from renewable energy sources without affecting the reliability or safety of the grid system. In such circumstances it may be appropriate for financial compensation to be given to those producers. Nevertheless, the objectives of this Directive require a sustained increase in the transmission and distribution of electricity produced from renewable energy sources without affecting the reliability or safety of the grid system. To this end, Member States should take appropriate measures in order to allow a higher penetration of electricity from renewable energy sources, inter alia, by taking into account the specificities of variable resources and resources which are not yet storable. To the extent required by the objectives set out in this Directive, the

connection of new renewable energy installations should be allowed as soon as possible. In order to accelerate grid connection procedures, Member States may provide for priority connection or reserved connection capacities for new installations producing electricity from renewable energy sources.

- (62) The costs of connecting new producers of electricity and gas from renewable energy sources to the electricity and gas grids should be objective, transparent and non-discriminatory and due account should be taken of the benefit that embedded producers of electricity from renewable energy sources and local producers of gas from renewable sources bring to the electricity and gas grids.
- (63) Electricity producers who want to exploit the potential of energy from renewable sources in the peripheral regions of the Community, in particular in island regions and regions of low population density, should, whenever feasible, benefit from reasonable connection costs in order to ensure that they are not unfairly disadvantaged in comparison with producers situated in more central, more industrialised and more densely populated areas.
- (64) Directive 2001/77/EC lays down the framework for the integration into the grid of electricity from renewable energy sources. However, there is a 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.
- (65) Biofuel production should be sustainable. Biofuels used for compliance with the targets laid down in this Directive, and those that benefit from national support schemes, should therefore be required to fulfil sustainability criteria.
- (66) The Community should take appropriate steps in the context of this Directive, including the promotion of sustainability criteria for biofuels and the development of second and third-generation biofuels in the Community and worldwide, and to strengthen agricultural research and knowledge creation in those areas.
- (67) The introduction of sustainability criteria for biofuels will not achieve its objective if those products that do not fulfil the criteria and would otherwise have been used as biofuels are used, instead, as bioliquids in the heating or electricity sectors. For this reason, the sustainability criteria should also apply to bioliquids in general.
- (68) The 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. Such sustainability criteria should form a coherent part of a wider scheme covering all bioliquids and not biofuels alone. Such sustainability criteria should therefore be included in this Directive. In order to ensure a coherent approach between energy and environment policies, and to avoid the additional costs to business and the environmental incoherence that would be associated with an inconsistent approach, it is essential to provide the same sustainability criteria for the use of biofuels for the purposes of this Directive on the one hand, and Directive 98/70/EC on the other. For the same reasons, double reporting should be avoided in this context. Furthermore, the

Commission and the competent national authorities should coordinate their activities in the framework of a committee specifically responsible for sustainability aspects. The Commission should, in addition, in 2009, review the possible inclusion of other biomass applications and the modalities relating thereto.

- (69) The increasing worldwide demand for biofuels and bioliquids, and the incentives for their use provided for in this Directive, should not have the effect of encouraging the destruction of biodiverse lands. Those finite resources, recognised in various international instruments to be of value to all mankind, should be preserved. Consumers in the Community would, in addition, find it morally unacceptable that their increased use of biofuels and bioliquids could have the effect of destroying biodiverse lands. For these reasons, it is necessary to provide sustainability criteria ensuring that biofuels and bioliquids can qualify for the incentives only when it can be guaranteed that they do not originate in biodiverse areas or, in the case of areas designated for nature protection purposes or for the protection of rare, threatened or endangered ecosystems or species, the relevant competent authority demonstrates that the production of the raw material does not interfere with those purposes. The sustainability criteria should consider forest as biodiverse where it is a primary forest in accordance with the definition used by the Food and Agriculture Organisation of the United Nations (FAO) in its Global Forest Resource Assessment, which countries use worldwide to report on the extent of primary forest or where it is protected by national nature protection law. Areas where collection of non-wood forest products occurs should be included, provided the human impact is small. Other types of forests as defined by the FAO, such as modified natural forests, semi-natural forests and plantations, should not be considered as primary forests. Having regard, furthermore, to the highly biodiverse nature of certain grasslands, both temperate and tropical, including highly biodiverse savannahs, steppes, scrublands and prairies, 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 geographical ranges to define such highly biodiverse grasslands in accordance with the best available scientific evidence and relevant international standards.
- (70) If land with high stocks of carbon in its soil or vegetation is converted for the cultivation of raw materials for biofuels or bioliquids, some of the stored carbon will generally be released into the atmosphere, leading to the formation of carbon dioxide. The resulting negative greenhouse gas impact can offset the positive greenhouse gas impact of the biofuels or bioliquids, in some cases by a wide margin. The full carbon effects of such conversion should therefore be accounted for in calculating the greenhouse gas emission saving of particular biofuels and bioliquids. This is necessary to ensure that the greenhouse gas emission saving calculation takes into account the totality of the carbon effects of the use of biofuels and bioliquids.
- (71) In calculating the greenhouse gas impact of land conversion, economic operators should be able to use actual values for the carbon stocks associated with the reference land use and the land use after conversion. They should also be able to use standard values. The work of the Intergovernmental Panel on Climate Change is the appropriate basis for such standard values. That work is not currently expressed in a form that is immediately

applicable by economic operators. The Commission should therefore produce guidance drawing on that work to serve as the basis for the calculation of carbon stock changes for the purposes of this Directive, including such changes to forested areas with a canopy cover of between 10 to 30 %, savannahs, scrublands and prairies.

- (72) It is appropriate for the Commission to develop methodologies with a view to assessing the impact of the drainage of peatlands on greenhouse gas emissions.
- (73) Land should not be converted for the production of biofuels if its 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 emission saving resulting from the production of biofuels or bioliquids. This would prevent unnecessary, burdensome research by economic operators and the conversion of high-carbon-stock land that would prove to be ineligible for producing raw materials for biofuels and bioliquids. Inventories of worldwide carbon stocks indicate that wetlands and continuously forested areas with a canopy cover of more than 30 % should be included in that category. Forested areas with a canopy cover of between 10 and 30 % should also be included, unless there is evidence demonstrating that their carbon stock is sufficiently low to justify their conversion in accordance with the rules laid down in this Directive. The reference to wetlands should take into account the definition laid down in the Convention on Wetlands of International Importance, especially as Waterfowl Habitat, adopted on 2 February 1971 in Ramsar.
- (74) The incentives provided for in this Directive will encourage increased production of biofuels and bioliquids worldwide. Where biofuels and bioliquids are made from raw material produced within the Community, they should also comply with Community environmental requirements for agriculture, including those concerning the protection of groundwater and surface water quality, and with social requirements. However, there is a concern that production of biofuels and bioliquids in certain third countries might not respect minimum environmental or social requirements. It is therefore appropriate to encourage the development of multilateral and bilateral agreements and voluntary international or national schemes that cover key environmental and social considerations, in order to promote the production of biofuels and bioliquids worldwide in a sustainable manner. In the absence of such agreements or schemes, Member States should require economic operators to report on those issues.
- (75) The requirements for a sustainability scheme for energy uses of biomass, other than bioliquids and biofuels, should be analysed by the Commission in 2009, taking into account the need for biomass resources to be managed in a sustainable manner.
- (76) Sustainability criteria will be effective only if they lead to changes in the behaviour of market actors. Those changes will occur only if biofuels and bioliquids meeting those 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 bioliquids meeting the sustainability criteria and the consumption of biofuels and bioliquids in the Community, providing an appropriate balance between supply and demand and ensuring a price premium that is greater than in systems where there is no such link. To ensure that biofuels and bioliquids meeting the sustainability

criteria can be sold at a higher price, the mass balance method should therefore be used to verify compliance. This should maintain the integrity of the system while at the same time avoiding the imposition of an unreasonable burden on industry. Other verification methods should, however, be reviewed.

- (77) Where appropriate, the Commission should take due account of the Millennium Ecosystem Assessment which contains useful data for the conservation of at least those areas that provide basic ecosystem services in critical situations such as watershed protection and erosion control.
- (78) It is appropriate to monitor the impact of biomass cultivation, such as through land-use changes, including displacement, the introduction of invasive alien species and other effects on biodiversity, and effects on food production and local prosperity. The Commission should consider all relevant sources of information, including the FAO hunger map. Biofuels should be promoted in a manner that encourages greater agricultural productivity and the use of degraded land.
- (79) It is in the interests of the Community to encourage the development of multilateral and bilateral agreements and voluntary international or national schemes that set standards for the production of sustainable biofuels and bioliquids, and that certify that the production of biofuels and bioliquids meets those standards. For that reason, provision should be made for such agreements or schemes to be recognised as providing reliable evidence and data, provided that they meet adequate standards of reliability, transparency and independent auditing.
- (80) It is necessary to lay down clear rules for the calculation of greenhouse gas emissions from biofuels and bioliquids and their fossil fuel comparators.
- (81) Co-products from the production and use of fuels should be taken into account in the calculation of greenhouse gas emissions. The substitution method is appropriate for the purposes of policy analysis, but not for the regulation of individual economic operators and individual consignments of transport fuels. In those cases the energy allocation method is the most appropriate method, as it is easy to apply, is predictable over time, minimises counter-productive incentives and produces results that are generally comparable with those produced by the substitution method. For the purposes of policy analysis the Commission should also, in its reporting, present results using the substitution method.
- (82) In order to avoid a disproportionate administrative burden, a list of default values should be laid down for common biofuel production pathways and that list should be updated and expanded when further reliable data is available. Economic operators should always be entitled to claim the level of greenhouse gas emission saving for biofuels and bioliquids established by that list. Where the default value for greenhouse gas emission saving from a production pathway lies below the required minimum level of greenhouse gas emission saving, 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.

- (83) It is appropriate for the data used in the calculation of the default values to be obtained from independent, scientifically expert sources and to be updated as appropriate as those sources progress their work. The Commission should encourage those sources to address, when they update their work, emissions from cultivation, the effect of regional and climatological conditions, the effects of cultivation using sustainable agricultural and organic farming methods, and the scientific contribution of producers, within the Community and in third countries, and civil society.
- (84) In order to avoid encouraging the cultivation of raw materials for biofuels and 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. However, to avoid a disproportionate administrative burden, it is appropriate for Member States to establish national or regional averages for emissions from cultivation, including from fertiliser use.
- (85) Global demand for agricultural commodities is growing. Part of that increased demand will be met through an increase in the amount of land devoted to agriculture. The restoration of land that has been severely degraded or heavily contaminated and therefore cannot be used, in its present state, for agricultural purposes is a way of increasing the amount of land available for cultivation. The sustainability scheme should promote the use of restored degraded land because the promotion of biofuels and bioliquids will contribute to the growth in demand for agricultural commodities. Even if biofuels themselves are made using raw materials from land already in arable use, the net increase in demand for crops caused by the promotion of biofuels could lead to a net increase in the cropped area. This could affect high carbon stock land, which would result in damaging carbon stock losses. To alleviate that risk, it is appropriate to introduce accompanying measures to encourage an increased rate of productivity on land already used for crops, the use of degraded land, and the adoption of sustainability requirements, comparable to those laid down in this Directive for Community biofuel consumption, in other biofuel-consuming countries. The Commission should develop a concrete methodology to minimise greenhouse gas emissions caused by indirect land-use changes. To this end, the Commission should analyse, on the basis of best available scientific evidence, in particular, the inclusion of a factor for indirect land-use changes in the calculation of greenhouse gas emissions and the need to incentivise sustainable biofuels which minimise the impacts of land-use change and improve biofuel sustainability with respect to indirect land-use change. In developing that methodology, the Commission should address, inter alia, the potential indirect land-use changes resulting from biofuels produced from non-food cellulosic material and from ligno-cellulosic material.
- (86) In order to permit the achievement of an adequate market 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.
- (87) In order to ensure that biofuels that diversify the range of feedstocks used become commercially viable, those biofuels should receive an extra weighting under national biofuel obligations.

- (88) Regular reporting is needed to ensure a continuing focus on progress in the development of energy from renewable sources at national and Community level. It is appropriate to require the use of a harmonised template for national renewable energy action plans which Member States should submit. Such plans could include estimated costs and benefits of the measures envisaged, measures relating to the necessary extension or reinforcement of the existing grid infrastructure, estimated costs and benefits to develop energy from renewable sources in excess of the level required by the indicative trajectory, information on national support schemes and information on their use of energy from renewable sources in new or renovated buildings.
- (89) 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 waste, residues, non-food cellulosic material, ligno-cellulosic material and algae, as well as non-irrigated plants grown in arid areas to fight desertification, by taking due account of the different costs of producing energy from traditional biofuels on the one hand and of those biofuels that give additional benefits on the other. Member States may encourage investment in research and development in relation to those and other renewable energy technologies that need time to become competitive.
- (90) The implementation of this Directive should reflect, where relevant, the provisions of the Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters, in particular as implemented through Directive 2003/4/EC of the European Parliament and of the Council of 28 January 2003 on public access to environmental information⁽¹⁶⁾.
- (91) 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 Commission⁽¹⁷⁾.
- (92) In particular, the Commission should be empowered to adapt the methodological principles and values necessary for assessing whether sustainability criteria have been fulfilled in relation to biofuels and bioliquids, to adapt the energy content of transport fuels to technical and scientific progress, to establish criteria and geographic ranges for determining highly biodiverse grassland, and to establish detailed definitions for severely degraded or contaminated land. Since those measures are of general scope and are designed to amend non-essential elements of this Directive, inter alia, by supplementing it with new non-essential elements, they must be adopted in accordance with the regulatory procedure with scrutiny provided for in Article 5a of Decision 1999/468/EC.
- (93) 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 transposition of this Directive. 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.

- (94) Since the measures provided for in Articles 17 to 19 also have an effect on the functioning of the internal market by harmonising the sustainability criteria for biofuels and bioliquids for the target accounting purposes under this Directive, and thus facilitate, in accordance with Article 17(8), trade between Member States in biofuels and bioliquids which comply with those conditions, they are based on Article 95 of the Treaty.
- (95) The sustainability scheme should not prevent Member States from taking into account, in their national support schemes, the higher production cost of biofuels and bioliquids that deliver benefits that exceed the minima laid down in the sustainability scheme.
- (96) Since the general objectives of this Directive, namely to achieve a 20 % share of energy from renewable sources in the Community's gross final consumption of energy and a 10 % share of energy from renewable sources in each Member State's transport energy 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.
- (97) In accordance with point 34 of the Interinstitutional agreement on better law-making⁽¹⁸⁾, Member States are encouraged to draw up, for themselves and in the interest of the Community, their own tables illustrating, as far as possible, the correlation between this Directive and the transposition measures and to make them public,

HAVE ADOPTED THIS DIRECTIVE:

Article 1

Subject matter and scope

This Directive establishes a common framework for the promotion of energy from renewable sources. It sets mandatory national targets for the overall share of energy from renewable sources in gross final consumption of energy and for the share of energy from renewable sources in transport. It lays down rules relating to statistical transfers between Member States, joint projects between Member States and with third countries, guarantees of origin, administrative procedures, information and training, and access to the electricity grid for energy from renewable sources. It establishes sustainability criteria for biofuels and bioliquids.

Article 2

Definitions

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

The following definitions also apply:

- (a) ‘energy from renewable sources’ means energy from renewable non-fossil sources, namely wind, solar, aerothermal, geothermal, hydrothermal and ocean energy, hydropower, biomass, landfill gas, sewage treatment plant gas and biogases;
- (b) ‘aerothermal energy’ means energy stored in the form of heat in the ambient air;
- (c) ‘geothermal energy’ means energy stored in the form of heat beneath the surface of solid earth;
- (d) ‘hydrothermal energy’ means energy stored in the form of heat in surface water;
- (e) ‘biomass’ means the biodegradable fraction of products, waste and residues from biological origin from agriculture (including vegetal and animal substances), forestry and related industries including fisheries and aquaculture, as well as the biodegradable fraction of industrial and municipal waste;
- (f) ‘gross final consumption of energy’ means the energy commodities delivered for energy purposes to industry, transport, households, services including public 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 and transmission;
- (g) ‘district heating’ or ‘district 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 or sites, for the use of space or process heating or cooling;
- (h) ‘bioliquids’ means liquid fuel for energy purposes other than for transport, including electricity and heating and cooling, produced from biomass;
- (i) ‘biofuels’ means liquid or gaseous fuel for transport produced from biomass;
- (j) ‘guarantee of origin’ means an electronic document which has the sole function of providing proof to a final customer that a given share or quantity of energy was produced from renewable sources as required by Article 3(6) of Directive 2003/54/EC;
- (k) ‘support scheme’ means any instrument, scheme or mechanism applied by a Member State or a group of Member States, that promotes the use of energy from renewable sources by reducing the cost of that 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. This includes, but is not restricted to, investment aid, tax exemptions or reductions, tax refunds, renewable energy obligation support schemes including those using green certificates, and direct price support schemes including feed-in tariffs and premium payments;
- (l) ‘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. This includes schemes under which such requirements may be fulfilled by using green certificates;
- (m) ‘actual value’ means the greenhouse gas emission saving for some or all of the steps of a specific biofuel production process calculated in accordance with the methodology laid down in part C of Annex V;

- (n) 'typical value' means an estimate of the representative greenhouse gas emission saving for a particular biofuel production pathway;
- (o) 'default value' means a value derived from a typical value by the application of pre-determined factors and that may, in circumstances specified in this Directive, be used in place of an actual value.

Article 3

Mandatory national overall targets and measures for the use of energy from renewable sources

1 Each Member State shall ensure that the share of energy from renewable sources, calculated in accordance with Articles 5 to 11, in gross final consumption of energy in 2020 is at least its national 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. Such mandatory national overall targets are consistent with a target of at least a 20 % share of energy from renewable sources in the Community's gross final consumption of energy in 2020. In order to achieve the targets laid down in this Article more easily, each Member State shall promote and encourage energy efficiency and energy saving.

2 Member States shall introduce measures effectively designed 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 In order to reach the targets set in paragraphs 1 and 2 of this Article Member States may, inter alia, apply the following measures:

- a support schemes;
- b measures of cooperation between different Member States and with third countries for achieving their national overall targets in accordance with Articles 5 to 11.

Without prejudice to Articles 87 and 88 of the Treaty, Member States shall have the right to decide, in accordance with Articles 5 to 11 of this Directive, to which extent they support energy from renewable sources which is produced in a different Member State.

4 Each Member State shall ensure that the share of energy from renewable sources in all forms of transport in 2020 is at least 10 % of the final consumption of energy in transport in that Member State.

For the purposes of this paragraph, the following provisions shall apply:

- a for the calculation of the denominator, that is the total amount of energy consumed in transport for the purposes of the first subparagraph, only petrol, diesel, biofuels consumed in road and rail transport, and electricity shall be taken into account;
- b for the calculation of the numerator, that is the amount of energy from renewable sources consumed in transport for the purposes of the first subparagraph, all types of energy from renewable sources consumed in all forms of transport shall be taken into account;
- c for the calculation of the contribution from electricity produced from renewable sources and consumed in all types of electric vehicles for the purpose of points (a) and (b), Member States may choose to use either the average share of electricity from renewable energy sources in the Community or the share of electricity from renewable energy sources in their own country as measured two years before the year in question. Furthermore, for the calculation of the electricity from renewable energy sources consumed by electric road vehicles, that consumption shall be considered to be 2,5 times the energy content of the input of electricity from renewable energy sources.

By 31 December 2011, the Commission shall present, if appropriate, a proposal permitting, subject to certain conditions, the whole amount of the electricity originating from renewable sources used to power all types of electric vehicles to be considered.

By 31 December 2011, the Commission shall also present, if appropriate, a proposal for a methodology for calculating the contribution of hydrogen originating from renewable sources in the total fuel mix.

Article 4

National renewable energy action plans

1 Each Member State shall adopt a national renewable energy action plan. The national renewable energy action plans shall set out Member States' national targets for the share of energy from renewable sources consumed in transport, electricity and heating and cooling in 2020, taking into account the effects of other policy measures relating to energy efficiency on final consumption of energy, and adequate measures to be taken to achieve those national overall targets, including cooperation between local, regional and national authorities, planned statistical transfers or joint projects, 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 13 to 19.

By 30 June 2009, the Commission shall adopt a template for the national renewable energy action plans. That template shall comprise the minimum requirements set out in Annex VI. Member States shall comply with that template in the presentation of their national renewable energy action plans.

2 Member States shall notify their national renewable energy action plans to the Commission by 30 June 2010.

3 Each Member State shall publish and notify to the Commission, six months before its national renewable energy action plan is due, a forecast document indicating:

- a its estimated excess production of energy from renewable sources compared to the indicative trajectory which could be transferred to other Member States in accordance with Articles 6 to 11, as well as its estimated potential for joint projects, until 2020; and
- b its estimated demand for energy from renewable sources to be satisfied by means other than domestic production until 2020.

That information may include elements relating to cost and benefits and financing. That forecast shall be updated in the reports of the Member States as set out in Article 22(1) (l) and (m).

4 A Member State whose share of energy from renewable sources fell below the indicative trajectory in the immediately preceding two-year period set out in part B of Annex I, shall submit an amended national renewable energy action plan to the Commission by 30 June of the following year, setting out adequate and proportionate measures to rejoin, within a reasonable timetable, the indicative trajectory in part B of Annex I.

The Commission may, if the Member State has not met the indicative trajectory by a limited margin, and taking due account of the current and future measures taken by the Member State, adopt a decision to release the Member State from the obligation to submit an amended national renewable energy action plan.

5 The Commission shall evaluate the national renewable energy action plans, notably the adequacy of the measures envisaged by the Member State in accordance with Article 3(2).

In response to a national renewable energy action plan or to an amended national renewable energy action plan, the Commission may issue a recommendation.

6 The Commission shall send to the European Parliament the national renewable energy action plans and the forecast documents in the form as made public on the transparency platform as referred to in Article 24(2), as well as any recommendation as referred to in paragraph 5 of this Article.

Article 5

Calculation of the share of energy from renewable sources

1 The gross final consumption of energy from renewable sources in each Member State shall be calculated as the sum of:

- a gross final consumption of electricity from renewable energy sources;
- b gross final consumption of energy from renewable sources for heating and cooling; and
- c final consumption of energy from renewable sources in transport.

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

Subject to the second subparagraph of Article 17(1), biofuels and bioliquids that do not fulfil the sustainability criteria set out in Article 17(2) to (6) shall not be taken into account.

2 Where a Member State considers that, due to force majeure, it is impossible for it to meet its share of energy from renewable sources in gross final consumption of energy in 2020 set out in the third column of the table in Annex I, it shall inform the Commission accordingly as soon as possible. The Commission shall adopt a decision on whether force majeure has been demonstrated. In the event that the Commission decides that force majeure has been demonstrated, it shall determine what adjustment shall be made to the Member State's gross final consumption of energy from renewable sources for the year 2020.

3 For the purposes of paragraph 1(a), gross final consumption of electricity from renewable energy sources shall be calculated as the quantity of electricity produced in a Member State from renewable energy sources, excluding the production of electricity in pumped storage units from water that has previously been pumped uphill.

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 and wind power shall be accounted for in accordance with the normalisation rules set out in Annex II.

4 For the purposes of paragraph 1(b), the gross final consumption of energy from renewable sources for heating and cooling shall be calculated as the quantity of district heating and cooling produced in a Member State from renewable sources, plus the consumption of other energy from renewable sources in industry, households, services, agriculture, forestry and fisheries, for heating, cooling and processing purposes.

In multi-fuel plants using renewable and conventional sources, only the part of heating and cooling 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.

Aerothermal, geothermal and hydrothermal heat energy captured by heat pumps shall be taken into account for the purposes of paragraph 1(b) provided that the final energy output significantly exceeds the primary energy input required to drive the heat pumps. The quantity of heat to be considered as energy from renewable sources for the purposes of this Directive shall be calculated in accordance with the methodology laid down in Annex VII.

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).

5 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. Those measures, designed to amend non-essential elements of this Directive, shall be adopted in accordance with the regulatory procedure with scrutiny referred to in Article 25(4).

6 The share of energy from renewable sources shall be calculated as the gross final consumption of energy from renewable sources divided by the gross final consumption of energy from all energy sources, expressed as a percentage.

For the purposes of the first subparagraph, the sum referred to in paragraph 1 shall be adjusted in accordance with Articles 6, 8, 10 and 11.

In calculating a Member State's gross final energy consumption for the purpose of measuring its compliance with the targets and indicative trajectory laid down in this Directive, the amount of energy consumed in aviation shall, as a proportion of that Member State's gross final consumption of energy, be considered to be no more than 6,18 %. For Cyprus and Malta the amount of energy consumed in aviation shall, as a proportion of those Member States' gross final consumption of energy, be considered to be no more than 4,12 %.

7 The methodology and definitions used in the calculation of the share of energy from renewable sources shall be those of Regulation (EC) No 1099/2008 of the European Parliament and of the Council of 22 October 2008 on energy statistics⁽¹⁹⁾.

Member States shall ensure coherence of statistical information used in calculating those sectoral and overall shares and statistical information reported to the Commission under Regulation (EC) No 1099/2008.

Article 6

Statistical transfers between Member States

1 Member States may agree on and may make arrangements for the statistical transfer of a specified amount of energy from renewable sources from one Member State to another Member State. The transferred quantity shall be:

- a deducted from the amount of energy from renewable sources that is taken into account in measuring compliance by the Member State making the transfer with the requirements of Article 3(1) and (2); and

- b added to the amount of energy from renewable sources that is taken into account in measuring compliance by another Member State accepting the transfer with the requirements of Article 3(1) and (2).

A statistical transfer shall not affect the achievement of the national target of the Member State making the transfer.

2 The arrangements referred to in paragraph 1 may have a duration of one or more years. They shall be notified to the Commission no later than three months after the end of each year in which they have effect. The information sent to the Commission shall include the quantity and price of the energy involved.

3 Transfers shall become effective only after all Member States involved in the transfer have notified the transfer to the Commission.

Article 7

Joint projects between Member States

1 Two or more Member States may cooperate on all types of joint projects relating to the production of electricity, heating or cooling from renewable energy sources. That cooperation may involve private operators.

2 Member States shall notify the Commission of the proportion or amount of electricity, heating or cooling from renewable energy sources produced by any joint project in their territory, that became operational after 25 June 2009, or by the increased capacity of an installation that was refurbished after that date, which is to be regarded as counting towards the national overall target of another Member State for the purposes of measuring compliance with the requirements of this Directive.

3 The notification referred to in paragraph 2 shall:

- a describe the proposed installation or identify the refurbished installation;
- b specify the proportion or amount of electricity or heating or cooling produced from the installation which is to be regarded as counting towards the national overall target of another Member State;
- c identify the Member State in whose favour the notification is being made; and
- d specify the period, in whole calendar years, during which the electricity or heating or cooling produced by the installation from renewable energy sources is to be regarded as counting towards the national overall target of the other Member State.

4 The period specified under paragraph 3(d) shall not extend beyond 2020. The duration of a joint project may extend beyond 2020.

5 A notification made under this Article shall not be varied or withdrawn without the joint agreement of the Member State making the notification and the Member State identified in accordance with paragraph 3(c).

Article 8

Effects of joint projects between Member States

1 Within three months of the end of each year falling within the period specified under Article 7(3)(d), the Member State that made the notification under Article 7 shall issue a letter of notification stating:

- a the total amount of electricity or heating or cooling produced during the year from renewable energy sources by the installation which was the subject of the notification under Article 7; and
- b the amount of electricity or heating or cooling produced during the year from renewable energy sources by that installation which is to count towards the national overall target of another Member State in accordance with the terms of the notification.

2 The notifying Member State shall send the letter of notification to the Member State in whose favour the notification was made and to the Commission.

3 For the purposes of measuring target compliance with the requirements of this Directive concerning national overall targets, the amount of electricity or heating or cooling from renewable energy sources notified in accordance with paragraph 1(b) shall be:

- a deducted from the amount of electricity or heating or cooling from renewable energy sources that is taken into account, in measuring compliance by the Member State issuing the letter of notification under paragraph 1; and
- b added to the amount of electricity or heating or cooling from renewable energy sources that is taken into account, in measuring compliance by the Member State receiving the letter of notification in accordance with paragraph 2.

Article 9

Joint projects between Member States and third countries

1 One or more Member States may cooperate with one or more third countries on all types of joint projects regarding the production of electricity from renewable energy sources. Such cooperation may involve private operators.

2 Electricity from renewable energy sources produced in a third country shall be taken into account only for the purposes of measuring compliance with the requirements of this Directive concerning national overall targets if the following conditions are met:

- a the electricity is consumed in the Community, a requirement that is deemed to be met where:
 - (i) an equivalent amount of electricity to the electricity accounted for has been firmly nominated to the allocated interconnection capacity by all responsible transmission system operators in the country of origin, the country of destination and, if relevant, each third country of transit;
 - (ii) an equivalent amount of electricity to the electricity accounted for has been firmly registered in the schedule of balance by the responsible transmission system operator on the Community side of an interconnector; and
 - (iii) the nominated capacity and the production of electricity from renewable energy sources by the installation referred to in paragraph 2(b) refer to the same period of time;
- b the electricity is produced by a newly constructed installation that became operational after 25 June 2009 or by the increased capacity of an installation that was refurbished after that date, under a joint project as referred to in paragraph 1; and
- c the amount of electricity produced and exported has not received support from a support scheme of a third country other than investment aid granted to the installation.

3 Member States may apply to the Commission, for the purposes of Article 5, for account to be taken of electricity from renewable energy sources produced and consumed in a third

country, in the context of the construction of an interconnector with a very long lead-time between a Member State and a third country if the following conditions are met:

- a construction of the interconnector started by 31 December 2016;
- b it is not possible for the interconnector to become operational by 31 December 2020;
- c it is possible for the interconnector to become operational by 31 December 2022;
- d after it becomes operational, the interconnector will be used for the export to the Community, in accordance with paragraph 2, of electricity generated from renewable energy sources;
- e the application relates to a joint project that fulfils the criteria in points (b) and (c) of paragraph 2 and that will use the interconnector after it becomes operational, and to a quantity of electricity that is no greater than the quantity that will be exported to the Community after the interconnector becomes operational.

4 The proportion or amount of electricity produced by any installation in the territory of a third country, which is to be regarded as counting towards the national overall target of one or more Member States for the purposes of measuring compliance with Article 3, shall be notified to the Commission. When more than one Member State is concerned, the distribution between Member States of this proportion or amount shall be notified to the Commission. This proportion or amount shall not exceed the proportion or amount actually exported to, and consumed in, the Community, corresponding to the amount referred to in paragraph 2(a)(i) and (ii) of this Article and meeting the conditions as set out in its paragraph (2)(a). The notification shall be made by each Member State towards whose overall national target the proportion or amount of electricity is to count.

5 The notification referred to in paragraph 4 shall:

- a describe the proposed installation or identify the refurbished installation;
- b specify the proportion or amount of electricity produced from the installation which is to be regarded as counting towards the national target of a Member State as well as, subject to confidentiality requirements, the corresponding financial arrangements;
- c specify the period, in whole calendar years, during which the electricity is to be regarded as counting towards the national overall target of the Member State; and
- d include a written acknowledgement of points (b) and (c) by the third country in whose territory the installation is to become operational and the proportion or amount of electricity produced by the installation which will be used domestically by that third country.

6 The period specified under paragraph 5(c) shall not extend beyond 2020. The duration of a joint project may extend beyond 2020.

7 A notification made under this Article may not be varied or withdrawn without the joint agreement of the Member State making the notification and the third country that has acknowledged the joint project in accordance with paragraph 5(d).

8 Member States and the Community shall encourage the relevant bodies of the Energy Community Treaty to take, in conformity with the Energy Community Treaty, the measures which are necessary so that the Contracting Parties to that Treaty can apply the provisions on cooperation laid down in this Directive between Member States.

Article 10

Effects of joint projects between Member States and third countries

1 Within three months of the end of each year falling within the period specified under Article 9(5)(c), the Member State having made the notification under Article 9 shall issue a letter of notification stating:

- a the total amount of electricity produced during that year from renewable energy sources by the installation which was the subject of the notification under Article 9;
- b the amount of electricity produced during the year from renewable energy sources by that installation which is to count towards its national overall target in accordance with the terms of the notification under Article 9; and
- c proof of compliance with the conditions set out in Article 9(2).

2 The Member State shall send the letter of notification to the third country which has acknowledged the project in accordance with Article 9(5)(d) and to the Commission.

3 For the purposes of measuring target compliance with the requirements of this Directive concerning national overall targets, the amount of electricity produced from renewable energy sources notified in accordance with paragraph 1(b) shall be added to the amount of energy from renewable sources that is taken into account, in measuring compliance by the Member State issuing the letter of notification.

Article 11

Joint support schemes

1 Without prejudice to the obligations of Member States under Article 3, two or more Member States may decide, on a voluntary basis, to join or partly coordinate their national support schemes. In such cases, a certain amount of energy from renewable sources produced in the territory of one participating Member State may count towards the national overall target of another participating Member State if the Member States concerned:

- a make a statistical transfer of specified amounts of energy from renewable sources from one Member State to another Member State in accordance with Article 6; or
- b set up a distribution rule agreed by participating Member States that allocates amounts of energy from renewable sources between the participating Member States. Such a rule shall be notified to the Commission no later than three months after the end of the first year in which it takes effect.

2 Within three months of the end of each year each Member State having made a notification under paragraph 1(b) shall issue a letter of notification stating the total amount of electricity or heating or cooling from renewable energy sources produced during the year which is to be the subject of the distribution rule.

3 For the purposes of measuring compliance with the requirements of this Directive concerning national overall targets, the amount of electricity or heating or cooling from renewable energy sources notified in accordance with paragraph 2 shall be reallocated between the concerned Member States in accordance with the notified distribution rule.

Article 12

Capacity increases

For the purpose of Article 7(2) and Article 9(2)(b), units of energy from renewable sources 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 13

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 and associated transmission and distribution network infrastructures for the production of electricity, heating or cooling from renewable energy sources, and to the process of transformation of biomass into biofuels or other energy products, are proportionate and necessary.

Member States shall, in particular, take the appropriate steps to ensure that:

- a subject to differences between Member States in their administrative structures and organisation, the respective responsibilities of national, regional and local administrative bodies for authorisation, certification and licensing procedures including spatial planning are clearly coordinated and defined, with transparent timetables for determining planning and building applications;
- b comprehensive information on the processing of authorisation, certification and licensing applications for renewable energy installations and on available assistance to applicants are made available at the appropriate level;
- c administrative procedures are streamlined and expedited at the appropriate administrative level;
- d rules governing authorisation, certification and licensing are objective, transparent, proportionate, do not discriminate between applicants and take fully into account the particularities of individual renewable energy technologies;
- e administrative charges paid by consumers, planners, architects, builders and equipment and system installers and suppliers are transparent and cost-related; and
- f simplified and less burdensome authorisation procedures, including through simple notification if allowed by the applicable regulatory framework, are established for smaller projects and for decentralised devices for producing energy from renewable sources, where appropriate.

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 and should not impede the operation of the internal market.

3 Member States shall recommend to all actors, in particular local and regional administrative bodies to ensure equipment and systems are installed for the use of electricity, heating and cooling from renewable energy sources and for district heating and cooling when

planning, designing, building and renovating industrial or residential areas. Member States shall, in particular, encourage local and regional administrative bodies to include heating and cooling from renewable energy sources in the planning of city infrastructure, where appropriate.

4 Member States shall introduce in their building regulations and codes appropriate measures in order to increase the share of all kinds of energy from renewable sources in the building sector.

In establishing such measures or in their regional support schemes, Member States may take into account national measures relating to substantial increases in energy efficiency and relating to cogeneration and to passive, low or zero-energy buildings.

By 31 December 2014, Member States shall, in their building regulations and codes or by other means with equivalent effect, where appropriate, require the use of minimum levels of energy from renewable sources in new buildings and in existing buildings that are subject to major renovation. Member States shall permit those minimum levels to be fulfilled, inter alia, through district heating and cooling produced using a significant proportion of renewable energy sources.

The requirements of the first subparagraph shall apply to the armed forces, only to the extent that its application does not cause any conflict with the nature and primary aim of the activities of the armed forces and with the exception of material used exclusively for military purposes.

5 Member States shall ensure that new public buildings, and existing public buildings that are subject to major renovation, at national, regional and local level fulfil an exemplary role in the context of this Directive from 1 January 2012 onwards. Member States may, inter alia, allow that obligation to be fulfilled by complying with standards for zero energy housing, or by providing that the roofs of public or mixed private-public buildings are used by third parties for installations that produce energy from renewable sources.

6 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 Community 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 those that fulfil the minimum requirements of eco-labelling established in Commission Decision 2007/742/EC of 9 November 2007 establishing the ecological criteria for the award of the Community eco-label to electrically driven, gas driven or gas absorption heat pumps⁽²⁰⁾.

In the case of solar thermal energy, Member States shall promote certified equipment and systems based on European standards where these exist, including eco-labels, energy labels and other technical reference systems established by the European standardisation bodies.

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, in their absence, international procedures if such procedures exist.

Article 14

Information and training

1 Member States shall ensure that information on support measures is made available to all relevant actors, such as consumers, builders, installers, architects, and suppliers of heating, cooling and electricity equipment and systems and of vehicles compatible with the use of energy from renewable sources.

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 energy sources is made available either by the supplier of the equipment or system or by the national competent authorities.

3 Member States shall ensure that certification schemes or equivalent qualification schemes become or are available by 31 December 2012 for installers of small-scale biomass boilers and stoves, solar photovoltaic and solar thermal systems, shallow geothermal systems and heat pumps. Those schemes may take into account existing schemes and structures as appropriate, and 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 those criteria.

4 Member States shall make available to the public information on certification schemes or equivalent qualification schemes as referred to in paragraph 3. Member States may also make available the list of installers who are qualified or certified in accordance with the provisions referred to in paragraph 3.

5 Member States shall ensure that guidance is made available to all relevant actors, notably for planners and architects so that they are able properly to consider the optimal combination of renewable energy sources, of high-efficiency technologies and of district heating and cooling when planning, designing, building and renovating industrial or residential areas.

6 Member States, with the participation of local and regional authorities, shall develop suitable information, awareness-raising, guidance or training programmes in order to inform citizens of the benefits and practicalities of developing and using energy from renewable sources.

Article 15

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

1 For the purposes of proving to final customers the share or quantity of energy from renewable sources in an energy supplier's energy mix in accordance with Article 3(6) of Directive 2003/54/EC, Member States shall ensure that the origin of electricity produced from renewable energy sources can be guaranteed as such within the meaning of this Directive, in accordance with objective, transparent and non-discriminatory criteria.

2 To that end, Member States shall ensure that a guarantee of origin is issued in response to a request from a producer of electricity from renewable energy sources. Member States may arrange for guarantees of origin to be issued in response to a request from producers of heating and cooling from renewable energy sources. Such an arrangement may be made subject to a minimum capacity limit. 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 unit of energy produced.

Member States shall ensure that the same unit of energy from renewable sources is taken into account only once.

Member States may provide that no support be granted to a producer when that producer receives a guarantee of origin for the same production of energy from renewable sources.

The guarantee of origin shall have no function in terms of a Member State's compliance with Article 3. Transfers of guarantees of origin, separately or together with the physical transfer of energy, shall have no effect on the decision of Member States to use statistical transfers, joint projects or joint support schemes for target compliance or on the calculation of the gross final consumption of energy from renewable sources in accordance with Article 5.

3 Any use of a guarantee of origin shall take place within 12 months of production of the corresponding energy unit. A guarantee of origin shall be cancelled once it has been used.

4 Member States or designated competent bodies shall supervise the issuance, transfer and cancellation of guarantees of origin. The designated competent bodies shall have non-overlapping geographical responsibilities, and be independent of production, trade and supply activities.

5 Member States or the designated competent bodies shall put in place appropriate mechanisms to ensure that guarantees of origin shall be issued, transferred and cancelled electronically and are accurate, reliable and fraud-resistant.

6 A guarantee of origin shall specify at least:

- a the energy source from which the energy was produced and the start and end dates of production;
- b whether it relates to:
 - (i) electricity; or
 - (ii) heating or cooling;
- c the identity, location, type and capacity of the installation where the energy was produced;
- d whether and to what extent the installation has benefited from investment support, whether and to what extent the unit of energy has benefited in any other way from a national support scheme, and the type of support scheme;
- e the date on which the installation became operational; and
- f the date and country of issue and a unique identification number.

7 Where an electricity supplier is required to prove the share or quantity of energy from renewable sources in its energy mix for the purposes of Article 3(6) of Directive 2003/54/EC, it may do so by using its guarantees of origin.

8 The amount of energy from renewable sources corresponding to guarantees of origin transferred by an electricity supplier to a third party shall be deducted from the share of energy from renewable sources in its energy mix for the purposes of Article 3(6) of Directive 2003/54/EC.

9 Member States shall recognise guarantees of origin issued by other Member States in accordance with this Directive exclusively as proof of the elements referred to in paragraph 1 and paragraph 6(a) to (f). A Member State may refuse to recognise a guarantee of origin only when it has well-founded doubts about its accuracy, reliability or veracity. The Member State shall notify the Commission of such a refusal and its justification.

10 If the Commission finds that a refusal to recognise a guarantee of origin is unfounded, the Commission may adopt a decision requiring the Member State in question to recognise it.

11 A Member State may introduce, in conformity with Community law, objective, transparent and non-discriminatory criteria for the use of guarantees of origin in complying with the obligations laid down in Article 3(6) of Directive 2003/54/EC.

12 Where energy suppliers market energy from renewable sources to consumers with a reference to environmental or other benefits of energy from renewable sources, Member States may require those energy suppliers to make available, in summary form, information on the amount or share of energy from renewable sources that comes from installations or increased capacity that became operational after 25 June 2009.

Article 16

Access to and operation of the grids

1 Member States shall take the appropriate steps to develop transmission and distribution grid infrastructure, intelligent networks, storage facilities and the electricity system, in order to allow the secure operation of the electricity system as it accommodates the further development of electricity production from renewable energy sources, including interconnection between Member States and between Member States and third countries. Member States shall also take appropriate steps to accelerate authorisation procedures for grid infrastructure and to coordinate approval of grid infrastructure with administrative and planning procedures.

2 Subject to requirements relating to the maintenance of the reliability and safety of the grid, based on transparent and non-discriminatory criteria defined by the competent national authorities:

- a 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;
- b Member States shall also provide for either priority access or guaranteed access to the grid-system of electricity produced from renewable energy sources;
- c Member States shall ensure that when dispatching electricity generating installations, transmission system operators shall give priority to generating installations using renewable energy sources in so far as the secure operation of the national electricity system permits and based on transparent and non-discriminatory criteria. Member States shall ensure that appropriate grid and market-related operational measures are taken in order to minimise the curtailment of electricity produced from renewable energy sources. If significant measures are taken to curtail the renewable energy sources in order to guarantee the security of the national electricity system and security of energy supply, Member States shall ensure that the responsible system operators report to the competent regulatory authority on those measures and indicate which corrective measures they intend to take in order to prevent inappropriate curtailments.

3 Member States shall require transmission system operators and distribution system operators to set up and make public their standard rules relating to the bearing and sharing of costs of technical adaptations, such as grid connections and grid reinforcements, improved operation of the grid and rules on the non-discriminatory implementation of the grid codes, which are necessary in order to integrate new producers feeding electricity produced from renewable energy sources into the interconnected grid.

Those 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 those producers to the grid and of the particular circumstances of producers located in peripheral regions and in regions of low population density. Those 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 the bearing and sharing of costs referred to in paragraph 3 by 30 June 2011 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 of energy from renewable sources wishing to be connected to the system with the comprehensive and necessary information required, including:

- a a comprehensive and detailed estimate of the costs associated with the connection;
- b a reasonable and precise timetable for receiving and processing the request for grid connection;
- c a reasonable indicative timetable for any proposed grid 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 tariffs 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. Member States shall ensure that the charging of transmission and distribution tariffs does not discriminate against gas from renewable energy sources.

8 Member States shall ensure that tariffs 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.

9 Where relevant, Member States shall assess the need to extend existing gas network infrastructure to facilitate the integration of gas from renewable energy sources.

10 Where relevant, Member States shall require transmission system operators and distribution system operators in their territory to publish technical rules in line with Article 6 of Directive 2003/55/EC of the European Parliament and of the Council of 26 June 2003 concerning the common rules for the internal market in natural gas⁽²¹⁾, in particular regarding network connection rules that include gas quality, gas odouration and gas pressure requirements. Member States shall also require transmission and distribution system operators to publish the connection tariffs to connect renewable gas sources based on transparent and non-discriminatory criteria.

11 Member States in their national renewable energy action plans shall assess the necessity to build new infrastructure for district heating and cooling produced from renewable energy sources in order to achieve the 2020 national target referred to in Article 3(1). Subject

to that assessment, Member States shall, where relevant, take steps with a view to developing a district heating infrastructure to accommodate the development of heating and cooling production from large biomass, solar and geothermal facilities.

Article 17

Sustainability criteria for biofuels and bioliquids

1 Irrespective of whether the raw materials were cultivated inside or outside the territory of the Community, energy from biofuels and bioliquids shall be taken into account for the purposes referred to in points (a), (b) and (c) only if they fulfil the sustainability criteria set out in paragraphs 2 to 6:

- 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 bioliquids.

However, biofuels and bioliquids produced from waste and residues, other than agricultural, aquaculture, fisheries and forestry residues, need only fulfil the sustainability criteria set out in paragraph 2 in order to be taken into account for the purposes referred to in points (a), (b) and (c).

2 The greenhouse gas emission saving from the use of biofuels and bioliquids taken into account for the purposes referred to in points (a), (b) and (c) of paragraph 1 shall be at least 35 %.

With effect from 1 January 2017, the greenhouse gas emission saving from the use of biofuels and bioliquids taken into account for the purposes referred to in points (a), (b) and (c) of paragraph 1 shall be at least 50 %. From 1 January 2018 that greenhouse gas emission saving shall be at least 60 % for biofuels and bioliquids produced in installations in which production started on or after 1 January 2017.

The greenhouse gas emission saving from the use of biofuels and bioliquids shall be calculated in accordance with Article 19(1).

In the case of biofuels and bioliquids produced by installations that were in operation on 23 January 2008, the first subparagraph shall apply from 1 April 2013.

3 Biofuels and bioliquids taken into account for the purposes referred to in points (a), (b) and (c) of paragraph 1 shall not be made from raw material obtained from land with high biodiversity value, namely land that had one of the following statuses in or after January 2008, whether or not the land continues to have that status:

- a primary forest and other wooded land, namely forest and other wooded land of native species, where there is no clearly visible indication of human activity and the ecological processes are not significantly disturbed;
- b areas designated:
 - (i) by law or by the relevant competent authority for nature protection purposes;
or
 - (ii) for the protection of rare, threatened or endangered ecosystems or species recognised by international agreements or included in lists drawn up by intergovernmental organisations or the International Union for the Conservation of Nature, subject to their recognition in accordance with the second subparagraph of Article 18(4);

- unless evidence is provided that the production of that raw material did not interfere with those nature protection purposes;
- c highly biodiverse grassland that is:
- (i) natural, namely grassland that would remain grassland in the absence of human intervention and which maintains the natural species composition and ecological characteristics and processes; or
 - (ii) non-natural, namely grassland that would cease to be grassland in the absence of human intervention and which is species-rich and not degraded, unless evidence is provided that the harvesting of the raw material is necessary to preserve its grassland status.

The Commission shall establish the criteria and geographic ranges to determine which grassland shall be covered by point (c) of the first subparagraph. Those measures, designed to amend non-essential elements of this Directive, by supplementing it shall be adopted in accordance with the regulatory procedure with scrutiny referred to in Article 25(4).

4 Biofuels and bioliquids taken into account for the purposes referred to in points (a), (b) and (c) of paragraph 1 shall not be made from raw material obtained from land with high carbon stock, namely land that had one of the following statuses in January 2008 and no longer has that status:

- a wetlands, namely land that is covered with or saturated by water permanently or for a significant part of the year;
- b continuously forested areas, namely land spanning more than one hectare with trees higher than five metres and a canopy cover of more than 30 %, or trees able to reach those thresholds in situ;
- c land spanning more than one hectare with trees higher than five metres and a canopy cover of between 10 % and 30 %, or trees able to reach those thresholds in situ, unless evidence is provided that the carbon stock of the area before and after conversion is such that, when the methodology laid down in part C of Annex V is applied, the conditions laid down in paragraph 2 of this Article would be fulfilled.

The provisions of 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 Biofuels and bioliquids taken into account for the purposes referred to in points (a), (b) and (c) of paragraph 1 shall not be made from raw material obtained from land that was peatland in January 2008, unless evidence is provided that the cultivation and harvesting of that raw material does not involve drainage of previously undrained soil.

6 Agricultural raw materials cultivated in the Community and used for the production of biofuels and bioliquids taken into account for the purposes referred to in points (a), (b) and (c) of paragraph 1 shall be obtained in accordance with the requirements and standards under the provisions referred to under the heading 'Environment' in part A and in point 9 of Annex II to Council Regulation (EC) No 73/2009 of 19 January 2009 establishing common rules for direct support schemes for farmers under the common agricultural policy and establishing certain support schemes for farmers⁽²²⁾ and in accordance with the minimum requirements for good agricultural and environmental condition defined pursuant to Article 6(1) of that Regulation.

7 The Commission shall, every two years, report to the European Parliament and the Council, in respect of both third countries and Member States that are a significant source of biofuels or of raw material for biofuels consumed within the Community, on national measures

taken to respect the sustainability criteria set out in paragraphs 2 to 5 and for soil, water and air protection. The first report shall be submitted in 2012.

The Commission shall, every two years, report to the European Parliament and the Council on the impact on social sustainability in the Community and in third countries of increased demand for biofuel, on the impact of Community biofuel policy on the availability of foodstuffs at affordable prices, in particular for people living in developing countries, and wider development issues. Reports shall address the respect of land-use rights. They shall state, both for third countries and Member States that are a significant source of raw material for biofuel consumed within the Community, whether the country has ratified and implemented each of the following Conventions of the International Labour Organisation:

- Convention concerning Forced or Compulsory Labour (No 29),
- Convention concerning Freedom of Association and Protection of the Right to Organise (No 87),
- Convention concerning the Application of the Principles of the Right to Organise and to Bargain Collectively (No 98),
- Convention concerning Equal Remuneration of Men and Women Workers for Work of Equal Value (No 100),
- Convention concerning the Abolition of Forced Labour (No 105),
- Convention concerning Discrimination in Respect of Employment and Occupation (No 111),
- Convention concerning Minimum Age for Admission to Employment (No 138),
- Convention concerning the Prohibition and Immediate Action for the Elimination of the Worst Forms of Child Labour (No 182).

Those reports shall state, both for third countries and Member States that are a significant source of raw material for biofuel consumed within the Community, whether the country has ratified and implemented:

- the Cartagena Protocol on Biosafety,
- the Convention on International Trade in Endangered Species of Wild Fauna and Flora.

The first report shall be submitted in 2012. The Commission shall, if appropriate, propose corrective action, in particular if evidence shows that biofuel production has a significant impact on food prices.

8 For the purposes referred to in points (a), (b) and (c) of paragraph 1, Member States shall not refuse to take into account, on other sustainability grounds, biofuels and bioliquids obtained in compliance with this Article.

9 The Commission shall report on requirements for a sustainability scheme for energy uses of biomass, other than biofuels and bioliquids, by 31 December 2009. That 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. That report and any proposals contained therein shall be based on the best available scientific evidence, taking into account new developments in innovative processes. If the analysis done for that purpose demonstrates that it would be appropriate to introduce amendments, in relation to forest biomass, in the calculation methodology in Annex V or in the sustainability criteria relating to carbon stocks applied to biofuels and bioliquids, the Commission shall, where appropriate, make proposals to the European Parliament and Council at the same time in this regard.

Article 18

Verification of compliance with the sustainability criteria for biofuels and bioliquids

1 Where biofuels and bioliquids are to be taken into account for the purposes referred to in points (a), (b) and (c) of Article 17(1), Member States shall require economic operators to show that the sustainability criteria set out in Article 17(2) to (5) have been fulfilled. For that purpose they shall require economic operators to use a mass balance system which:

- a allows consignments of raw material or biofuel with differing sustainability characteristics to be mixed;
- b requires information about the sustainability characteristics and sizes of the consignments referred to in point (a) to remain assigned to the mixture; and
- c provides for the sum of all consignments withdrawn from the mixture to be 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 for allowing for other verification methods in relation to some or all types of raw material, biofuel or bioliquids. 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 the imposition of an unreasonable burden on industry. The report shall be accompanied, where appropriate, by proposals to the European Parliament and the Council concerning the use of other verification methods.

3 Member States shall take measures to ensure that economic operators submit reliable information and 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 submitted, and to provide evidence that this has been done. The auditing shall verify that the systems used by economic operators are accurate, reliable and protected against fraud. It shall evaluate the frequency and methodology of sampling and the robustness of the data.

The information referred to in the first subparagraph shall include in particular information on compliance with the sustainability criteria set out in Article 17(2) to (5), appropriate and relevant information on measures taken for soil, water and air protection, the restoration of degraded land, the avoidance of excessive water consumption in areas where water is scarce and appropriate and relevant information concerning measures taken in order to take into account the issues referred to in the second subparagraph of Article 17(7).

The Commission shall, in accordance with the advisory procedure referred to in Article 25(3), establish the list of appropriate and relevant information referred to in the first two subparagraphs. It shall ensure, in particular, that the provision of that information does not represent an excessive administrative burden for operators in general or for smallholder farmers, producer organisations and cooperatives in particular.

The obligations laid down in this paragraph shall apply whether the biofuels or bioliquids are produced within the Community or imported.

Member States shall submit to the Commission, in aggregated form, the information referred to in the first subparagraph of this paragraph. The Commission shall publish that information on the transparency platform referred to in Article 24 in summary form preserving the confidentiality of commercially sensitive information.

4 The Community shall endeavour to conclude bilateral or multilateral agreements with third countries containing provisions on sustainability criteria that correspond to those of this Directive. Where the Community has concluded agreements containing provisions relating to matters covered by the sustainability criteria set out in Article 17(2) to (5), the Commission may decide that those agreements demonstrate that biofuels and bioliquids produced from raw materials cultivated in those countries comply with the sustainability criteria in question. When those agreements are concluded, due consideration shall be given to measures taken for the conservation of areas that provide, in critical situations, basic ecosystem services (such as watershed protection and erosion control), for soil, water and air protection, indirect land-use changes, the restoration of degraded land, the avoidance of excessive water consumption in areas where water is scarce and to the issues referred to in the second subparagraph of Article 17(7).

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 17(2) or demonstrate that consignments of biofuel comply with the sustainability criteria set out in Article 17(3) to (5). The Commission may decide that those schemes contain accurate data for the purposes of information on measures taken for the conservation of areas that provide, in critical situations, basic ecosystem services (such as watershed protection and erosion control), for soil, water and air protection, the restoration of degraded land, the avoidance of excessive water consumption in areas where water is scarce and on the issues referred to in the second subparagraph of Article 17(7). The Commission may also recognise areas for the protection of rare, threatened or endangered ecosystems or species recognised by international agreements or included in lists drawn up by intergovernmental organisations or the International Union for the Conservation of Nature for the purposes of Article 17(3)(b)(ii).

The Commission may decide that voluntary national or international schemes to measure greenhouse gas emission saving contain accurate data for the purposes of Article 17(2).

The Commission may decide that land that falls within the scope of a national or regional recovery programme aimed at improving severely degraded or heavily contaminated land fulfils the criteria referred to in point 9 of part C of Annex V.

5 The Commission shall adopt decisions under paragraph 4 only 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 emission saving, such schemes shall also comply with the methodological requirements in Annex V. Lists of areas of high biodiversity value as referred to in Article 17(3)(b)(ii) shall meet adequate standards of objectivity and coherence with internationally recognised standards and provide for appropriate appeal procedures.

6 Decisions under paragraph 4 shall be adopted in accordance with the advisory procedure referred to in Article 25(3). Such decisions shall be valid for a period of no more than five years.

7 When an economic operator provides proof or data obtained in accordance with an agreement or scheme that has been the subject of a decision pursuant to paragraph 4, to the extent covered by that decision, a Member State shall not require the supplier to provide

further evidence of compliance with the sustainability criteria set out in Article 17(2) to (5) nor information on measures referred to in the second subparagraph of paragraph 3 of this Article.

8 At the request of a Member State or on its own initiative the Commission shall examine the application of Article 17 in relation to a source of biofuel or bioliquid and, within six months of receipt of a request and in accordance with the advisory procedure referred to in Article 25(3), decide whether the Member State concerned may take biofuel or bioliquid from that source into account for the purposes referred to in points (a), (b) and (c) of Article 17(1).

9 By 31 December 2012, the Commission shall report to the European Parliament and to the Council on:

- a the effectiveness of the system in place for the provision of information on sustainability criteria; and
- b whether it is feasible and appropriate to introduce mandatory requirements in relation to air, soil or water protection, taking into account the latest scientific evidence and the Community's international obligations.

The Commission shall, if appropriate, propose corrective action.

Article 19

Calculation of the greenhouse gas impact of biofuels and bioliquids

1 For the purposes of Article 17(2), the greenhouse gas emission saving from the use of biofuel and bioliquids shall be calculated as follows:

- a where a default value for greenhouse gas emission saving for the production pathway is laid down in part A or B of Annex V and where the e_l value for those biofuels or bioliquids calculated in accordance with point 7 of part C of Annex V is equal to or less than zero, by using that default value;
- b by using an actual value calculated in accordance with the methodology laid down in part C of Annex V; or
- c by using a value calculated as the sum of the factors of the formula referred to in point 1 of part C of Annex V, where disaggregated default values in part D or E of Annex V may be used for some factors, and actual values, calculated in accordance with the methodology laid down in part C of Annex V, for all other factors.

2 By 31 March 2010, Member States shall submit to the Commission a report including a list of those areas on their territory classified as level 2 in the nomenclature of territorial units for statistics (NUTS) or as a more disaggregated NUTS level in accordance with Regulation (EC) No 1059/2003 of the European Parliament and of the Council of 26 May 2003 on the establishment of a common classification of territorial units for statistics (NUTS)⁽²³⁾ 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 'Disaggregated default values for cultivation' in part D of Annex V to this Directive, accompanied by a description of the method and data used to establish that list. That method shall take into account soil characteristics, climate and expected raw material yields.

3 The default values in part A of Annex V for biofuels, and the disaggregated default values for cultivation in part D of Annex V for biofuels and bioliquids, may be used only when their raw materials are:

- a cultivated outside the Community;
- b cultivated in the Community in areas included in the lists referred to in paragraph 2; or
- c waste or residues other than agricultural, aquaculture and fisheries residues.

For biofuels and bioliquids not falling under points (a), (b) or (c), actual values for cultivation shall be used.

4 By 31 March 2010, the Commission shall submit a report to the European Parliament and to the Council on the feasibility of drawing up lists of areas in third countries 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 V, accompanied if possible by such lists and a description of the method and data used to establish them. The report shall, if appropriate, be accompanied by relevant proposals.

5 The Commission shall report by 31 December 2012, and every two years thereafter, on the estimated typical and default values in parts B and E of Annex V, paying particular attention to emissions from transport and processing, and may, where necessary, decide to correct the values. Those measures, designed to amend non-essential elements of this Directive, shall be adopted in accordance with the regulatory procedure with scrutiny referred to in Article 25(4).

6 The Commission shall, by 31 December 2010, submit a report to the European Parliament and to the Council reviewing the impact of indirect land-use change on greenhouse gas emissions and addressing ways to minimise that impact. The report shall, if appropriate, be accompanied, by a proposal, based on the best available scientific evidence, containing a concrete methodology for emissions from carbon stock changes caused by indirect land-use changes, ensuring compliance with this Directive, in particular Article 17(2).

Such a proposal shall include the necessary safeguards to provide certainty for investment undertaken before that methodology is applied. With respect to installations that produced biofuels before the end of 2013, the application of the measures referred to in the first subparagraph shall not, until 31 December 2017, lead to biofuels produced by those installations being deemed to have failed to comply with the sustainability requirements of this Directive if they would otherwise have done so, provided that those biofuels achieve a greenhouse gas emission saving of at least 45 %. This shall apply to the capacities of the installations of biofuels at the end of 2012.

The European Parliament and the Council shall endeavour to decide, by 31 December 2012, on any such proposals submitted by the Commission.

7 Annex V may be adapted to technical and scientific progress, including by the addition of values for further biofuel production pathways for the same or for other raw materials and by modifying the methodology laid down in part C. Those measures, designed to amend non-essential elements of this Directive, inter alia, by supplementing it, shall be adopted in accordance with the regulatory procedure with scrutiny referred to in Article 25(4).

Regarding the default values and methodology laid down in Annex V, particular consideration shall be given to:

- the method of accounting for wastes and residues,
- the method of accounting for co-products,
- the method of accounting for cogeneration, and
- the status given to agricultural crop residues as co-products.

The default values for waste vegetable or animal oil biodiesel shall be reviewed as soon as possible.

Any adaptation of or addition to the list of default values in Annex V shall comply with the following:

- (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 must be typical of normal production processes;
- (b) in all other cases default values must be conservative compared to normal production processes.

8 Detailed definitions, including technical specifications required for the categories set out in point 9 of part C of Annex V shall be established. Those measures, designed to amend non-essential elements of this Directive by supplementing it, shall be adopted in accordance with the regulatory procedure with scrutiny referred to in Article 25(4).

Article 20

Implementing measures

The implementing measures referred to in the second subparagraph of Article 17(3), the third subparagraph of Article 18(3), Article 18(6), Article 18(8), Article 19(5), the first subparagraph of Article 19(7), and Article 19(8) shall also take full account of the purposes of Article 7a of Directive 98/70/EC.

Article 21

Specific provisions related to energy from renewable sources in transport

1 Member States shall ensure that information is given to the public on the availability and environmental benefits of all different renewable sources of energy for transport. When the percentages of biofuels, blended in mineral oil derivatives, exceed 10 % by volume, Member States shall require this to be indicated at the sales points.

2 For the purposes of demonstrating compliance with national renewable energy obligations placed on operators and the target for the use of energy from renewable sources in all forms of transport referred to in Article 3(4), 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 22

Reporting by the Member States

1 Each Member State shall submit a report to the Commission on progress in the promotion and use of energy from renewable sources by 31 December 2011, and every two years thereafter. The sixth report, to be submitted by 31 December 2021, shall be the last report required.

The report shall detail, in particular:

- a the sectoral (electricity, heating and cooling, and transport) 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 energy from renewable sources taking into account the indicative trajectory in part B of Annex I, in accordance with Article 5;
- 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 renewable energy action plan, and information on how supported electricity is allocated to final customers for purposes of Article 3(6) of Directive 2003/54/EC;
- c how, where applicable, the Member State has structured its 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 16(3);
 - g developments in the availability and use of biomass resources for energy purposes;
 - h changes in commodity prices and land use 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 the production of biofuels and bioliquids on biodiversity, water resources, water quality and soil quality within the Member State;
 - k the estimated net greenhouse gas emission saving due to the use of energy from renewable sources;
 - l the estimated excess production of energy from renewable sources compared to the indicative trajectory which could be transferred to other Member States, as well as the estimated potential for joint projects, until 2020;
 - m the estimated demand for energy from renewable sources to be satisfied by means other than domestic production until 2020; and
 - n information on how the share of biodegradable waste in waste used for producing energy has been estimated, and what steps have been taken to improve and verify such estimates.
- 2 In estimating net greenhouse gas emission saving from the use of biofuels, the Member State may, for the purpose of the reports referred to in paragraph 1, use the typical values given in part A and part B of Annex V.
- 3 In its first report, the Member State shall outline whether it intends 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; or
 - 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.
- 4 In each report the Member State may correct the data of the previous reports.

Article 23

Monitoring and reporting by the Commission

1 The Commission shall monitor the origin of biofuels and bioliquids consumed in the Community and the impact of their production, including impact as a result of displacement, on land use in the Community and the main third countries of supply. Such monitoring shall be based on Member States' reports, submitted pursuant to Article 22(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. The Commission shall monitor all installations to which Article 19(6) applies.

2 The Commission shall maintain a dialogue and exchange information with third countries and biofuel producers, consumer organisations and civil society concerning the general implementation of the measures in this Directive relating to biofuels and bioliquids. It shall, within that framework, pay particular attention to the impact biofuel production may have on food prices.

3 On the basis of the reports submitted by Member States pursuant to Article 22(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 emission saving 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, in particular, 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, considering economic and environmental impacts, including impacts on biodiversity;
- c the scope for identifying, in a scientifically objective manner, geographical areas of high biodiversity value that are not covered in Article 17(3);
- d the impact of increased demand for biomass on biomass using sectors;
- e the availability of biofuels made from waste, residues, non-food cellulosic material and ligno-cellulosic material; and
- f indirect land-use changes in relation to all production pathways.

The Commission shall, if appropriate, propose corrective action.

6 On the basis of the reports submitted by Member States pursuant to Article 22(3), the Commission shall analyse the effectiveness of measures taken by Member States on establishing a single administrative body responsible for processing authorisation, certification and licensing applications and providing assistance to applicants.

7 In order to improve financing and coordination with a view to the achievement of the 20 % target referred to in Article 3(1), the Commission shall, by 31 December 2010, present an analysis and action plan on energy from renewable sources with a view, in particular, to:

- a the better use of structural funds and framework programmes;

- b the better and increased use of funds from the European Investment Bank and other public finance institutions;
 - c better access to risk capital notably by analysing the feasibility of a risk sharing facility for investments in energy from renewable sources in the Community similar to the Global Energy Efficiency and Renewable Energy Fund initiative which is aimed at third countries;
 - d the better coordination of Community and national funding and other forms of support; and
 - e the better coordination in support of renewable energy initiatives whose success depends on action by actors in several Member States.
- 8 By 31 December 2014, the Commission shall present a report, addressing, in particular, the following elements:

- (a) a review of the minimum greenhouse gas emission saving thresholds to apply from the dates referred to in the second subparagraph of Article 17(2), on the basis of an impact assessment taking into account, in particular, technological developments, available technologies and the availability of first and second-generation bio-fuels with a high level of greenhouse gas emission saving;
- (b) with respect to the target referred to in Article 3(4), a review of:
 - (i) the cost-efficiency of the measures to be implemented to achieve the target;
 - (ii) an assessment of the feasibility of reaching the target whilst ensuring the sustainability of biofuels production in the Community and in third countries, and considering economic, environmental and social impacts, including indirect effects and impacts on biodiversity, as well as the commercial availability of second-generation biofuels;
 - (iii) the impact of the implementation of the target on the availability of foodstuffs at affordable prices;
 - (iv) the commercial availability of electric, hybrid and hydrogen powered vehicles, as well as the methodology chosen to calculate the share of energy from renewable sources consumed in the transport sector;
 - (v) the evaluation of specific market conditions, considering, in particular, markets on which transport fuels represent more than half of the final energy consumption, and markets which are fully dependent on imported biofuels;
- (c) an evaluation of the implementation of this Directive, in particular with regard to cooperation mechanisms, in order to ensure that, together with the possibility for the Member States to continue to use national support schemes referred to in Article 3(3), those mechanisms enable Member States to achieve the national targets defined in Annex I on the best cost-benefit basis, of technological developments, and the conclusions to be drawn to achieve the target of 20 % of energy from renewable sources at Community level.

On the basis of that report, the Commission shall submit, if appropriate, proposals to the European Parliament and the Council, addressing the above elements and in particular:

- for the element contained in point (a), a modification of the minimum greenhouse gas emission saving referred to in that point, and
- for the element contained in point (c), appropriate adjustments of the cooperation measures provided for in this Directive in order to improve their effectiveness for

achieving the target of 20 %. Such proposals shall neither affect the 20 % target nor Member States' control over national support schemes and cooperation measures.

9 In 2018, the Commission shall present a Renewable Energy Roadmap for the post-2020 period.

That roadmap shall, if appropriate, be accompanied by proposals to the European Parliament and the Council for the period after 2020. The roadmap shall take into account the experience of the implementation of this Directive and technological developments in energy from renewable sources.

10 In 2021, the Commission shall present a report reviewing the application of this Directive. That report shall, in particular, address the role of the following elements in having enabled Member States to achieve the national targets defined in Annex I on the best cost-benefit basis:

- a the process of preparing forecasts and national renewable energy action plans;
- b the effectiveness of the cooperation mechanisms;
- c technological developments in energy from renewable sources, including the development of the use of biofuels in commercial aviation;
- d the effectiveness of the national support schemes; and
- e the conclusions of the Commission reports referred to in paragraphs 8 and 9.

Article 24

Transparency platform

1 The Commission shall establish an online public transparency platform. That platform shall serve to increase transparency, and facilitate and promote cooperation between Member States, in particular concerning statistical transfers referred to in Article 6 and joint projects referred to in Articles 7 and 9. In addition, the platform may be used to make public relevant information which the Commission or a Member State deems to be of key importance to this Directive and to the achievement of its objectives.

2 The Commission shall make public on the transparency platform the following information, where appropriate in aggregated form, preserving the confidentiality of commercially sensitive information:

- a Member States' national renewable energy action plans;
- b Member States' forecast documents referred to in Article 4(3), complemented as soon as possible with the Commission's summary of excess production and estimated import demand;
- c Member States' offers to cooperate on statistical transfers or joint projects, upon request of the Member State concerned;
- d the information referred to in Article 6(2) on the statistical transfers between Member States;
- e the information referred to in Article 7(2) and (3) and Article 9(4) and (5) on joint projects;
- f Member States' national reports referred to in Article 22;
- g the Commission reports referred to in Article 23(3).

However, upon request of the Member State that submitted the information, the Commission shall not make public Member States' forecast documents referred to

in Article 4(3), or the information in Member States' national reports referred to in Article 22(1)(l) and (m).

Article 25

Committees

1 Except in the cases referred to in paragraph 2, the Commission shall be assisted by the Committee on Renewable Energy Sources.

2 For matters relating to the sustainability of biofuels and bioliquids, the Commission shall be assisted by the Committee on the Sustainability of Biofuels and Bioliquids.

3 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.

4 Where reference is made to this paragraph, Article 5a(1) to (4) and Article 7 of Decision 1999/468/EC shall apply, having regard to the provisions of Article 8 thereof.

Article 26

Amendments and repeal

1 In Directive 2001/77/EC, Article 2, Article 3(2), and Articles 4 to 8 shall be 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 shall be deleted with effect from 1 April 2010.

3 Directives 2001/77/EC and 2003/30/EC shall be repealed with effect from 1 January 2012.

Article 27

Transposition

1 Without prejudice to Article 4(1), (2) and (3), Member States shall bring into force the laws, regulations and administrative provisions necessary to comply with this Directive by 5 December 2010.

When Member States adopt measures, they shall contain a reference to this Directive or shall be accompanied by such a reference on the occasion of their official publication. The methods of making such a reference shall be laid down by the Member States.

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 28

Entry into force

This Directive shall enter into force on the 20th day following its publication in the *Official Journal of the European Union*.

Article 29

Addressees

This Directive is addressed to the Member States.

Done at Strasbourg, 23 April 2009.

For the European Parliament

The President

H.-G. PÖTTERING

For the Council

The President

P. NEČAS

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ANNEX I

National overall targets for the share of energy from renewable sources in gross final consumption of energy in 2020⁽²⁴⁾

A.National overall targets

	Share of energy from renewable sources in gross final consumption of energy, 2005 (S₂₀₀₅)	Target for share of energy from renewable sources in gross final consumption of energy, 2020 (S₂₀₂₀)
Belgium	2,2 %	13 %
Bulgaria	9,4 %	16 %
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	32,6 %	40 %
Lithuania	15,0 %	23 %
Luxembourg	0,9 %	11 %
Hungary	4,3 %	13 %
Malta	0,0 %	10 %
Netherlands	2,4 %	14 %
Austria	23,3 %	34 %
Poland	7,2 %	15 %
Portugal	20,5 %	31 %
Romania	17,8 %	24 %
Slovenia	16,0 %	25 %
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 consist of the following shares of energy from renewable sources:

$S_{2005} + 0,20 (S_{2020} - S_{2005})$, as an average for the two-year period 2011 to 2012;

$S_{2005} + 0,30 (S_{2020} - S_{2005})$, 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 and wind power

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

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

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 hydropower plants of the Member State measured in GWh, excluding production from pumped storage units using water that has previously been pumped uphill;
- C_i = the total installed capacity, net of pumped storage, of all hydropower plants of the Member State at the end of year i , measured in MW.

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

$$Q_{N(norm)} = \frac{C_N + C_{N-1}}{2} \times \frac{\sum_{i=N-1}^N Q_i}{\sum_{j=N-1}^N \left(\frac{C_j + C_{j-1}}{2} \right)}$$

where:

- N = reference year;
- $Q_{N(norm)}$ = normalised electricity generated by all wind power plants of the Member State in year N , for accounting purposes;
- Q_i = the quantity of electricity actually generated in year i by all wind power plants of the Member State measured in GWh;

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- C_j = the total installed capacity of all the wind power plants of the Member State at the end of year j , measured in MW;
- n = 4 or the number of years preceding year N for which capacity and production data are available for the Member State in question, whichever is lower.

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)	44	34

thermochemically treated with hydrogen)		
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 wood gas)	50	—
Petrol	43	32
Diesel	43	36

ANNEX IV

Certification of installers

The certification schemes or equivalent qualification schemes referred to in Article 14(3) shall be based on the following criteria:

1. The certification or qualification process shall be transparent and clearly defined by the Member State or the administrative body they appoint.
2. Biomass, heat pump, shallow geothermal 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 effected 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. The training leading to installer certification or qualification shall include both theoretical and practical parts. At the end of the training, the installer must have the skills required to install the relevant equipment 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.

5. The training course shall end with an examination leading to a certificate or qualification. The examination shall include a practical assessment of successfully installing biomass boilers or stoves, heat pumps, shallow geothermal installations, solar photovoltaic or solar thermal installations.
6. The certification schemes or equivalent qualification schemes referred to in Article 14(3) shall take due account of the following guidelines:
 - (a) Accredited training programmes should be offered to installers with work experience, who have undergone, or are undergoing, the following types of training:
 - (i) 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;
 - (ii) 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;
 - (iii) in the case of a solar photovoltaic or solar thermal installer: training as a plumber or 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
 - (iv) a vocational training scheme to provide an installer with adequate skills corresponding to a three years education in the skills referred to in point (a), (b) or (c) including both classroom and workplace learning.
 - (b) The theoretical part of the biomass stove and boiler installer training should give an overview of the market situation of biomass and cover ecological aspects, biomass fuels, logistics, fire protection, related 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 should also provide good knowledge of any European standards for technology and biomass fuels, such as pellets, and biomass related national and Community law.
 - (c) The theoretical part of the heat pump installer training should give an overview of the market situation for heat pumps and cover geothermal resources and ground source temperatures of different regions, soil and rock identification for thermal conductivity, 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 should also provide good knowledge of any European standards for heat pumps, and of relevant national and Community law. The installer should demonstrate the following key competences:
 - (i) 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);
- (ii) an 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; and
 - (iii) the 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.
- (d) The theoretical part of the solar photovoltaic and solar thermal installer training should give an overview of the market situation of solar products and cost and profitability comparisons, and cover ecological aspects, components, characteristics and dimensioning of solar systems, selection of accurate systems and dimensioning of components, determination of the heat demand, fire protection, related subsidies, as well as the design, installation, and maintenance of solar photovoltaic and solar thermal installations. The training should also provide good knowledge of any European standards for technology, and certification such as Solar Keymark, and related national and Community law. The installer should demonstrate the following key competences:
- (i) the 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;
 - (ii) the 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;
 - (iii) the 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; and
 - (iv) for solar photovoltaic systems in particular, the 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

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associated equipment and subsystems and selecting an appropriate interconnection point.

- (e) The installer certification should be time restricted, so that a refresher seminar or event would be necessary for continued certification.

ANNEX V

Rules for calculating the greenhouse gas impact of biofuels, 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	61 %	52 %
wheat ethanol (process fuel not specified)	32 %	16 %
wheat ethanol (lignite as process fuel in CHP plant)	32 %	16 %
wheat ethanol (natural gas as process fuel in conventional boiler)	45 %	34 %
wheat ethanol (natural gas as process fuel in CHP plant)	53 %	47 %
wheat ethanol (straw as process fuel in CHP plant)	69 %	69 %
corn (maize) ethanol, Community produced (natural gas as process fuel in CHP plant)	56 %	49 %
sugar cane ethanol	71 %	71 %
the part from renewable sources of ethyl-tertio-butyl-ether (ETBE)	Equal to that of the ethanol production pathway used	
the part from renewable sources of tertiary-amyl-ethyl-ether (TAEE)	Equal to that of the ethanol production pathway used	
rape seed biodiesel	45 %	38 %
sunflower biodiesel	58 %	51 %

a Not including animal oil produced from animal by-products classified as category 3 material in accordance with Regulation (EC) No 1774/2002 of the European Parliament and of the Council of 3 October 2002 laying down health rules on animal by-products not intended for human consumption.

b [OJ L 273, 10.10.2002, p. 1.](#)

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soybean biodiesel	40 %	31 %
palm oil biodiesel (process not specified)	36 %	19 %
palm oil biodiesel (process with methane capture at oil mill)	62 %	56 %
waste vegetable or animal ^a oil biodiesel	88 %	83 %
hydrotreated vegetable oil from rape seed	51 %	47 %
hydrotreated vegetable oil from sunflower	65 %	62 %
hydrotreated vegetable oil from palm oil (process not specified)	40 %	26 %
hydrotreated vegetable oil from palm oil (process with methane capture at oil mill)	68 %	65 %
pure vegetable oil from rape seed	58 %	57 %
biogas from municipal organic waste as compressed natural gas	80 %	73 %
biogas from wet manure as compressed natural gas	84 %	81 %
biogas from dry manure as compressed natural gas	86 %	82 %

a Not including animal oil produced from animal by-products classified as category 3 material in accordance with Regulation (EC) No 1774/2002 of the European Parliament and of the Council of 3 October 2002 laying down health rules on animal by-products not intended for human consumption.

b [OJ L 273, 10.10.2002, p. 1.](#)

B. Estimated typical and default values for future biofuels that were not on the market or were on the market only in negligible quantities 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 %

Status: This is the original version (as it was originally adopted).

farmed wood Fischer-Tropsch diesel	93 %	93 %
waste wood dimethylether (DME)	95 %	95 %
farmed wood DME	92 %	92 %
waste wood methanol	94 %	94 %
farmed wood methanol	91 %	91 %
the part from renewable sources of methyl-tertio-butyl-ether (MTBE)	Equal to that of the methanol production pathway used	

C. Methodology

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

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

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_{sca}	= emission saving from soil carbon accumulation via improved agricultural management;
e_{ccs}	= emission saving from carbon capture and geological storage;
e_{ccr}	= emission saving from carbon capture and replacement; and
e_{ee}	= emission saving from excess electricity from cogeneration.

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

- Greenhouse gas emissions from fuels, E, shall be expressed in terms of grams of CO₂ equivalent per MJ of fuel, gCO_{2eq}/MJ.
- By derogation from point 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 be made only where evidence of the differences in useful work done is provided.
- Greenhouse gas emission saving from biofuels and bioliquids shall be calculated as:

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

where

E_B	= total emissions from the biofuel or bioliquid; and
E_F	= total emissions from the fossil fuel comparator.

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

CO ₂	: 1
N ₂ O	: 296
CH ₄	: 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 those emissions the following rule shall be applied:

$$e_l = (CS_R - CS_A) \times 3,664 \times 1/20 \times 1/P - e_B^{(25)},$$

where

e_l	= annualised greenhouse gas emissions from carbon stock change due to land-use change (measured as mass of CO ₂ -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 later;
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). In cases where the carbon stock accumulates over more than one year, the value attributed to CS_A shall be the estimated stock per unit area after 20 years or when the crop reaches maturity, whichever the earlier;
P	= the productivity of the crop (measured as biofuel or bioliquid energy per unit area per year); and
e_B	= bonus of 29 gCO _{2eq} /MJ biofuel or bioliquid if biomass is obtained from restored degraded land under the conditions provided for in point 8.

8. The bonus of 29 gCO_{2eq}/MJ shall be attributed if evidence is provided that the land:
- was not in use for agriculture or any other activity in January 2008; and
 - falls into one of the following categories:
 - severely degraded land, including such land that was formerly in agricultural use;
 - heavily contaminated land.

The bonus of 29 gCO_{2eq}/MJ shall apply for a period of up to 10 years from the date of conversion of the land to agricultural use, provided that a steady increase in carbon stocks as well as a sizable reduction in erosion phenomena for land falling under (i) are ensured and that soil contamination for land falling under (ii) is reduced.

9. The categories referred to in point 8(b) are defined as follows:
- (a) ‘severely degraded land’ means land that, for a significant period of time, has either been significantly salinated or presented significantly low organic matter content and has been severely eroded;
 - (b) ‘heavily contaminated land’ means land that is unfit for the cultivation of food and feed due to soil contamination.

Such land shall include land that has been the subject of a Commission decision in accordance with the fourth subparagraph of Article 18(4).

10. The Commission shall adopt, by 31 December 2009, guidelines for the calculation of land carbon stocks drawing on the 2006 IPCC Guidelines for National Greenhouse Gas Inventories — volume 4. The Commission guidelines shall serve as the basis for the calculation of land carbon stocks for the purposes of this Directive.
11. 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. By derogation from this rule, 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.

12. 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. Emissions from transport and distribution to be taken into account under point 6 shall not be covered by this point.
13. Emissions from the fuel in use, e_u , shall be taken to be zero for biofuels and bioliquids.
14. Emission saving from carbon capture and geological storage e_{ccs} , that have not already been accounted for in e_p , 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.
15. Emission saving 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.
16. Emission saving 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 that 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 saving associated with that 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.

17. 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).
18. For the purposes of the calculation referred to in point 17, 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 bioliquids, all co-products, including electricity that does not fall under the scope of point 16, shall be taken into account for the purposes of that 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, including crude glycerine (glycerine that is not refined), shall be considered to have zero life-cycle greenhouse gas emissions up to the process of collection of those materials.

In the case of fuels produced in refineries, the unit of analysis for the purposes of the calculation referred to in point 17 shall be the refinery.

19. For biofuels, for the purposes of the calculation referred to in point 4, the fossil fuel comparator E_F shall be the latest available actual average emissions from the fossil part of 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 point 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 point 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 point 4, the fossil fuel comparator E_F shall be 85 gCO_{2eq}/MJ.

D. Disaggregated default values for biofuels and bioliquids

Disaggregated default values for cultivation: ' e_{ec} ' as defined in part C of this Annex

Biofuel and bioliquid production pathway	Typical greenhouse gas emissions(gCO _{2eq} /MJ)	Default greenhouse gas emissions(gCO _{2eq} /MJ)
sugar beet ethanol	12	12
wheat ethanol	23	23

^a Not including animal oil produced from animal by-products classified as category 3 material in accordance with Regulation (EC) No 1774/2002.

Status: This is the original version (as it was originally adopted).

corn (maize) ethanol, Community produced	20	20
sugar cane ethanol	14	14
the part from renewable sources of ETBE	Equal to that of the ethanol production pathway used	
the part from renewable sources of TAEE	Equal to that of the ethanol production pathway used	
rape seed biodiesel	29	29
sunflower biodiesel	18	18
soybean biodiesel	19	19
palm oil biodiesel	14	14
waste vegetable or animal ^a oil biodiesel	0	0
hydrotreated vegetable oil from rape seed	30	30
hydrotreated vegetable oil from sunflower	18	18
hydrotreated vegetable oil from palm oil	15	15
pure vegetable oil from rape seed	30	30
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

^a Not including animal oil produced from animal by-products classified as category 3 material in accordance with Regulation (EC) No 1774/2002.

Disaggregated default values for processing (including excess electricity): ' $e_p - e_{ee}$ ' as defined in part C of this Annex

Biofuel and bioliquid production pathway	Typical greenhouse gas emissions(gCO_{2eq}/MJ)	Default greenhouse gas emissions(gCO_{2eq}/MJ)
sugar beet ethanol	19	26
wheat ethanol (process fuel not specified)	32	45
wheat ethanol (lignite as process fuel in CHP plant)	32	45

Status: This is the original version (as it was originally adopted).

wheat ethanol (natural gas as process fuel in conventional boiler)	21	30
wheat ethanol (natural gas as process fuel in CHP plant)	14	19
wheat ethanol (straw as process fuel in CHP plant)	1	1
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	Equal to that of the ethanol production pathway used	
the part from renewable sources of TAEE	Equal to that of the ethanol production pathway used	
rape seed biodiesel	16	22
sunflower biodiesel	16	22
soybean biodiesel	18	26
palm oil biodiesel (process not specified)	35	49
palm oil biodiesel (process with methane capture at oil mill)	13	18
waste vegetable or animal oil biodiesel	9	13
hydrotreated vegetable oil from rape seed	10	13
hydrotreated vegetable oil from sunflower	10	13
hydrotreated vegetable oil from palm oil (process not specified)	30	42
hydrotreated vegetable oil from palm oil (process with methane capture at oil mill)	7	9
pure vegetable oil from rape seed	4	5
biogas from municipal organic waste as compressed natural gas	14	20

Status: This is the original version (as it was originally adopted).

biogas from wet manure as compressed natural gas	8	11
biogas from dry manure as compressed natural gas	8	11

Disaggregated default values for transport and distribution: 'e_{td}' as defined in part C of this Annex

Biofuel and bioliquid production pathway	Typical greenhouse gas emissions(gCO_{2eq}/MJ)	Default greenhouse gas emissions(gCO_{2eq}/MJ)
sugar beet ethanol	2	2
wheat ethanol	2	2
corn (maize) ethanol, Community produced	2	2
sugar cane ethanol	9	9
the part from renewable sources of ETBE	Equal to that of the ethanol production pathway used	
the part from renewable sources of TAAE	Equal to that of the ethanol production pathway used	
rape seed biodiesel	1	1
sunflower biodiesel	1	1
soybean biodiesel	13	13
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 for cultivation, processing, transport and distribution

Status: This is the original version (as it was originally adopted).

Biofuel and bioliquid production pathway	Typical greenhouse gas emissions(gCO_{2eq}/MJ)	Default greenhouse gas emissions(gCO_{2eq}/MJ)
sugar beet ethanol	33	40
wheat ethanol (process fuel not specified)	57	70
wheat ethanol (lignite as process fuel in CHP plant)	57	70
wheat ethanol (natural gas as process fuel in conventional boiler)	46	55
wheat ethanol (natural gas as process fuel in CHP plant)	39	44
wheat ethanol (straw as process fuel in CHP plant)	26	26
corn (maize) ethanol, Community produced (natural gas as process fuel in CHP plant)	37	43
sugar cane ethanol	24	24
the part from renewable sources of ETBE	Equal to that of the ethanol production pathway used	
the part from renewable sources of TAEE	Equal to that of the ethanol production pathway used	
rape seed biodiesel	46	52
sunflower biodiesel	35	41
soybean biodiesel	50	58
palm oil biodiesel (process not specified)	54	68
palm oil biodiesel (process with methane capture at oil mill)	32	37
waste vegetable or animal oil biodiesel	10	14
hydrotreated vegetable oil from rape seed	41	44
hydrotreated vegetable oil from sunflower	29	32
hydrotreated vegetable oil from palm oil (process not specified)	50	62

Status: This is the original version (as it was originally adopted).

hydrotreated vegetable oil from palm oil (process with methane capture at oil mill)	27	29
pure vegetable oil from rape seed	35	36
biogas from municipal organic waste as compressed natural gas	17	23
biogas from wet manure as compressed natural gas	13	16
biogas from dry manure as compressed natural gas	12	15

E. Estimated disaggregated default values for future biofuels and bioliquids that were not on the market or were only on the market in negligible quantities in January 2008
Disaggregated default values for cultivation: ' e_{ec} ' as defined in part C of this Annex

Biofuel and 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	1	1
farmed wood DME	5	5
waste wood methanol	1	1
farmed wood methanol	5	5
the part from renewable sources of MTBE	Equal to that of the methanol production pathway used	

Disaggregated default values for processing (including excess electricity): ' $e_p - e_{ee}$ ' as defined in part C of this Annex

Biofuel and 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

Status: This is the original version (as it was originally adopted).

wood DME	0	0
wood methanol	0	0
the part from renewable sources of MTBE	Equal to that of the methanol production pathway used	

Disaggregated default values for transport and distribution: ‘ e_{td} ’ as defined in part C of this Annex

Biofuel and 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	4	4
farmed wood DME	2	2
waste wood methanol	4	4
farmed wood methanol	2	2
the part from renewable sources of MTBE	Equal to that of the methanol production pathway used	

Total for cultivation, processing, transport and distribution

Biofuel and 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	5	5
farmed wood DME	7	7
waste wood methanol	5	5
farmed wood methanol	7	7

the part from renewable sources of MTBE	Equal to that of the methanol production pathway used
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ANNEX VI

Minimum requirements for the harmonised
template for national renewable energy action plans

1. Expected final energy consumption:

Gross final energy consumption in electricity, transport and heating and cooling for 2020 taking into account the effects of energy efficiency policy measures.

2. National sectoral 2020 targets and estimated shares of energy from renewable sources in electricity, heating and cooling and transport:

- (a) target share of energy from renewable sources in electricity in 2020;
- (b) estimated trajectory for the share of energy from renewable sources in electricity;
- (c) target share of energy from renewable sources in heating and cooling in 2020;
- (d) estimated trajectory for the share of energy from renewable sources in heating and cooling;
- (e) estimated trajectory for the share of energy from renewable sources in transport;
- (f) national indicative trajectory as referred to in Article 3(2) and part B of Annex I.

3. Measures for achieving the targets:

- (a) overview of all policies and measures concerning the promotion of the use of energy from renewable sources;
- (b) specific measures to fulfil the requirements of Articles 13, 14 and 16, including the need to extend or reinforce existing infrastructure to facilitate the integration of the quantities of energy from renewable sources needed to achieve the 2020 national target, measures to accelerate the authorisation procedures, measures to reduce non-technological barriers and measures concerning Articles 17 to 21;
- (c) support schemes for the promotion of the use of energy from renewable sources in electricity applied by the Member State or a group of Member States;
- (d) support schemes for the promotion of the use of energy from renewable sources in heating and cooling applied by the Member State or a group of Member States;
- (e) support schemes for the promotion of the use of energy from renewable sources in transport applied by the Member State or a group of Member States;
- (f) specific measures on the promotion of the use of energy from biomass, especially for new biomass mobilisation taking into account:
 - (i) biomass availability: both domestic potential and imports;
 - (ii) measures to increase biomass availability, taking into account other biomass users (agriculture and forest-based sectors);

- (g) planned use of statistical transfers between Member States and planned participation in joint projects with other Member States and third countries:
- (i) the estimated excess production of energy from renewable sources compared to the indicative trajectory which could be transferred to other Member States;
 - (ii) the estimated potential for joint projects;
 - (iii) the estimated demand for energy from renewable sources to be satisfied by means other than domestic production.
4. Assessments:
- (a) the total contribution expected of each renewable energy technology to meet the mandatory 2020 targets and the indicative trajectory for the shares of energy from renewable sources in electricity, heating and cooling and transport;
 - (b) the total contribution expected of the energy efficiency and energy saving measures to meet the mandatory 2020 targets and the indicative trajectory for the shares of energy from renewable sources in electricity, heating and cooling and transport.

ANNEX VII

Accounting of energy from heat pumps

The amount of aerothermal, geothermal or hydrothermal energy captured by heat pumps to be considered energy from renewable sources for the purposes of this Directive, E_{RES} , shall be calculated in accordance with the following formula:

$$E_{RES} = Q_{usable} * (1 - 1/SPF)$$

where

- Q_{usable} = the estimated total usable heat delivered by heat pumps fulfilling the criteria referred to in Article 5(4), implemented as follows: Only heat pumps for which $SPF > 1,15 * 1/\eta$ shall be taken into account,
- SPF = the estimated average seasonal performance factor for those heat pumps,
- η is the ratio between total gross production of electricity and the primary energy consumption for electricity production and shall be calculated as an EU average based on Eurostat data.

By 1 January 2013, the Commission shall establish guidelines on how Member States are to estimate the values of Q_{usable} and SPF for the different heat pump technologies and applications, taking into consideration differences in climatic conditions, especially very cold climates.

- (1) Opinion of 17 September 2008 (OJ C 77, 31.3.2009, p. 43).
- (2) OJ C 325, 19.12.2008, p. 12.
- (3) Opinion of the European Parliament of 17 December 2008 (not yet published in the Official Journal) and Council Decision of 6 April 2009.
- (4) OJ L 283, 27.10.2001, p. 33.
- (5) OJ L 123, 17.5.2003, p. 42.
- (6) OJ L 176, 15.7.2003, p. 37.
- (7) OJ L 350, 28.12.1998, p. 58.
- (8) OJ C 219 E, 28.8.2008, p. 82.
- (9) OJ L 1, 4.1.2003, p. 65.
- (10) OJ L 191, 22.7.2005, p. 29.
- (11) OJ L 114, 27.4.2006, p. 64.
- (12) OJ L 198, 20.7.2006, p. 18.
- (13) OJ L 204, 21.7.1998, p. 37.
- (14) OJ L 255, 30.9.2005, p. 22.
- (15) OJ L 52, 21.2.2004, p. 50.
- (16) OJ L 41, 14.2.2003, p. 26.
- (17) OJ L 184, 17.7.1999, p. 23.
- (18) OJ C 321, 31.12.2003, p. 1.
- (19) OJ L 304, 14.11.2008, p. 1.
- (20) OJ L 301, 20.11.2007, p. 14.
- (21) OJ L 176, 15.7.2003, p. 57.
- (22) OJ L 30, 31.1.2009, p. 16.
- (23) OJ L 154, 21.6.2003, p. 1.
- (24) In order to be able to achieve the national objectives set out in this Annex, it is underlined that the State aid guidelines for environmental protection recognise the continued need for national mechanisms of support for the promotion of energy from renewable sources.
- (25) The quotient obtained by dividing the molecular weight of CO₂ (44,010 g/mol) by the molecular weight of carbon (12,011 g/mol) is equal to 3,664.