

Luxembourg action plan for renewable energy

Within the framework of the European Parliament and Council Directive Directive D2009/28/EC of 23 April on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC

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1. SUMMARY OF THE NATIONAL POLICY FOR RENEWABLE ENERGIES

Please give a short overview of the national renewable energy policy describing the objectives of the policy (such as security of supply, environmental, economic and social benefits) and the main strategic lines of action.

Renewable energies represent to Luxembourg a central pillar for the establishment of a sustainable energy system. The critical reasons for the promotion of renewable energies in Luxembourg lie in their contribution to environmental protection, supply security and economic development.

The Luxembourg policy for the development of renewable energies is based on three main areas. The utilisation of national potentials is a top priority. Here, an intensive development of the electricity and heat generation is desired. In the area of electricity, biomass and wind will, in the future, represent the two top performers. In the heating field, in addition to the development of a grid-connected heat supply based on biomass, decentralised heating production is also of great relevance. In households, the technologies of solar thermal energy and heat pumps will increasingly be used in addition to biomass. Luxembourg primarily intends to continue the promotion of renewable energies in the electricity sector through feed-in tariffs and investment incentives as well as in the heating sector through investment incentives.

The second component of the national strategy involves energy from renewable sources in the transport sector. Here the 10 % target established by the directive needs to be achieved. In this context Luxembourg is — due to limited land potential — focussing on sustainable biofuel imports by requiring that a percentage of biofuels be added to regular fuel, but also focussing on an ambitious national development of electromobility in public transport and in private transport in order to meet the requirements.

The third main pillar is represented by the cooperation mechanisms. Based on limited national potentials and according to the current situation, Luxembourg must rely on this possibility in order to be able to reach its 11% overall target. Initial analyses suggest that a combination of joint projects and statistic transfers may represent the most effective solution.

Generally the Luxembourg strategy for renewable energies should make an efficient link possible between the energy and economic policies of the country. In this way, the creation of new jobs and investment opportunities as well as the stimulation of the economy will accompany the plan for the continuous development of renewable energies in Luxembourg.

2. EXPECTED ENERGY CONSUMPTION 2010-2020

In this section, Member States are required to set out their estimates of gross final energy consumption of all types of energy (from both renewable and conventional sources), overall and for each sector, in the period up to 2020.

These estimates have to also take into account the expected effects of energy efficiency and saving measures to be introduced during the period. Under the heading ‘reference scenario’ a scenario has to be presented taking into account only the energy efficiency and savings measures adopted before 2009. Under the heading ‘additional energy efficiency scenario’ a scenario has to be presented taking into account all measures to be adopted from 2009. The elaboration of the

other parts of the NREAP is based on this additional energy efficiency scenario.

The term ‘consumption for heating and cooling’ has to be understood as the derived heat produced (heat sold), plus the final consumption of all other energy commodities except electricity in end-use sectors such as industry, households, services, agriculture, forestry and fisheries. The notion of heating and cooling covers therefore also final energy consumption for processing. Electricity may also be used for heating and cooling in final consumption, but this electricity is covered in the electricity target, which is why it is excluded here.

According to Article 5(6) of Directive 2009/28/EC, for the purpose of measuring compliance with the 2020 target and the interim trajectory, the amount of energy consumed in aviation is to be considered to be no more than 6.18 % of the Member State's gross final energy consumption (4.12 % for Cyprus and Malta). The appropriate adjustments (if any) could be made in the table. The box shows how to calculate this.

BOX — How to calculate the ‘aviation capping mechanism’ in the Renewable Energy Directive

Assume Country A has a share of aviation energy consumption (AEC) of its total gross final energy consumption (GFEC) of X:

$$X = \text{AEC}/\text{GFEC}$$

Assume $X > 6.18 \%$

In this case the cap implies that for the purpose of assessing compliance,

$$\text{GFEC}_{\text{adjusted}} = \text{GFEC} - \text{AEC} + \text{AEC}_{\text{adjusted}}$$

$$\text{where } \text{AEC}_{\text{adjusted}} = 0.0618 * \text{GFEC}$$

In other terms

$$\text{GFEC}_{\text{adjusted}} = \text{GFEC} - \text{AEC} + 0.0618 * \text{GFEC} =$$

$$= \text{GFEC} - X * \text{GFEC} + 0.0618 * \text{GFEC} =$$

$$= \text{GFEC} * (.0618 - X)$$

The ‘adjustment’ as a % of the real GFEC and as a function of X is therefore

$$\text{Adjustment} = (\text{GFEC} - \text{GFEC}_{\text{adjusted}})/\text{GFEC} =$$

$$= X - 0.0618$$

NB: In the case of Cyprus and Malta, the figures of 4.12 % and 0.0412 should replace the figures of 6.18 % and 0.0618 respectively.

Table 1 Expected gross final energy consumption of Luxembourg in heating and cooling, electricity and transport up to 2020 taking into account the effects of energy efficiency and energy saving measures¹ 2010-2020 (ktoe)

	2005	2010		2011		2012		2013		2014	
	base year -	reference scenario	scenario with additional energy efficiency	reference scenario	scenario with additional energy efficiency	reference scenario	scenario with additional energy efficiency	reference scenario	scenario with additional energy efficiency	reference scenario	scenario with additional energy efficiency
1) Heating and cooling ⁽²⁾	1 189	1 293	1 235	1 303	1 235	1 313	1 235	1 324	1 234	1 334	1,234
2) Electricity ⁽³⁾	567	553	549	556	548	559	547	562	546	565	545
3) Transport as in Article 3(4)a (4) Bethel. al	2 416	2 309	2 086	2 337	2 111	2 365	2 136	2 392	2 161	2 420	2,186
4) Gross final energy consumption(s)	4 605	4 558	4 273	4 599	4 296	4 639	4 318	4 680	4 341	4 720	4,364

¹ The estimated values for energy efficiency and energy saving measures must agree with the forecasts which the Member States communicate to the Commission particularly in Action Plans with regard to the energy service guidelines of Directive on overall energy efficiency of buildings. If other units are used in these Action Plans, the conversion factors used are to be given.

² It is the final energy consumption of all energy commodities except electricity for purposes other than transport, plus the consumption of heat for own use at electricity and heat plants and heat losses in networks (items '2. Own use by plant' and '11. Transmission and distribution losses' of Regulation (EC) No 1099/2008 (p. 23-24).

³ The gross electricity consumption is national gross electricity production, including auto production, plus imports, minus exports.

⁴ Transport consumption as defined in Article 3(4)(a) of Directive 2009/28/EC. Renewable electricity in road transport for this figure should be multiplied by a factor of 2.5, as indicated by Article 3(4)(c) of Directive 2009/

⁵ As defined in Article(2)(f) of Directive 2009/28/EC. This comprises final energy consumption plus network losses and own use of heat and electricity at electricity and heating plants (NB: this does not include consumption of electricity for pumped hydro storage or for transformation in electrical boilers or heat pumps at district heating plants).

<i>The following calculation is needed only if final energy consumption for aviation is expected to be higher than 6.18 % (4.12 % for Malta and Cyprus):</i>											
Final consumption in aviation	433	414	414	414	414	414	414	414	414	414	414
Reduction for aviation limit(s) Article 5(6)	148	132	150	130	148	127	147	125	146	122	144
Total consumption after reduction for aviation limit	4 457	4 426	4 123	4 469	4 147	4 512	4 171	4 555	4 195	4 598	4 219

⁶ According to Article 5(6) consumption for aviation has to be considered only up to 6.18 % (Community average), for Cyprus and Malta up to 4.12 % of gross final energy consumption .

	2015		2016		2017		2018		2019		2020	
	Reference scenario	Scenario with additional energy efficiency	Reference scenario	Scenario with additional energy efficiency	Reference scenario	Scenario with additional energy efficiency	Reference scenario	Scenario with additional energy efficiency	Reference scenario	Scenario with additional energy efficiency	Reference scenario	Scenario with additional energy efficiency
1. Heating and cooling ⁷	1 344	1 234	1 363	1 241	1 381	1 248	1 399	1 255	1 417	1 262	1 436	1 268
2. Electricity ⁸	568	544	574	549	581	554	588	559	595	564	602	569
3. Transport as in Article 3(4)a	2 448	2 211	2 475	2 236	2 502	2 260	2 529	2 285	2 557	2 309	2 584	2 334
4. Gross final energy consumption ¹⁰	4 760	4 386	4 812	4 415	4 864	4 444	4 916	4 472	4 967	4 501	5 019	4 530
<i>The following calculation is needed only if final energy consumption for aviation is expected to be higher than 6.18 % (Malta and Cyprus 4.12 %):</i>												
Final consumption in aviation	414	414	414	414	414	414	414	414	414	414	414	414
Reduction for aviation limit ¹¹ Article 5(6)	120	143	117	141	113	139	110	138	107	136	104	134
Total consumption after reduction for aviation limit	4 641	4 243	4 696	4 274	4 750	4 304	4 805	4 335	4 860	4 365	4 915	4 396

⁷ See footnote 4.

⁸ See footnote 5.

⁹ See footnote 6.

¹⁰ See footnote 7.

¹¹ See footnote 8.

3. RENEWABLE ENERGY TARGETS AND TRAJECTORIES

3.1 National overall target

Table 2: National overall target for the share of energy from renewable sources in gross final consumption of energy in 2005 and 2020 (figures to be transcribed from Annex I, Part A to Directive 2009/28/EC):

A. Share of energy from renewable sources in gross final consumption of energy in 2005 (S 2005) (%)	0.90 %
B. Target of energy from renewable sources in gross final consumption of energy in 2020 (S 2020) (%)	11.00 %
C. Expected total adjusted energy consumption in 2020 (from Table 1, last cell) (ktoe)	4.396
D. Expected amount of energy from renewable sources corresponding to the 2020 target (calculated as B x C) (ktoe)	483.5

Member States may choose to look to the flexibility measures in Articles 6, 7, 8 and 11 of Directive 2009/28/EC with a view to making some of their own renewable energy consumption available to count towards the targets of other Member State(s) — or with a view to counting energy from renewable sources consumed in other Member State(s) towards their own targets. In addition they may use physical imports from third countries of electricity from renewable energy sources in accordance with the provisions of Articles 9 and 10 of Directive 2009/28/EC.

Any assessments of the renewable energy potential of your country can be attached in annex.

Any renewable energy targets at regional level or in major cities or in major energy consuming industries supporting the national renewable energy target fulfilment can also be attached in annex.

3.2. Sectoral targets and trajectories

According to Article 4(1) of Directive 2009/28/EC, Member States are required to set their targets for the share of energy from renewable sources in 2020 in the following sectors:

- heating and cooling,*
- electricity,*
- transport.*

The total of the three sectoral targets, translated into expected volumes (ktoe) including the planned use of flexibility measures, has to be at least as high as the expected amount of energy from renewable sources that corresponds to the Member State's 2020 target (as reported in the last cell of Table 2).

The transport target, in addition, has to be compatible with the requirements of Article 3(4) of Directive 2009/28/EC for a 10 % share of renewable energy in transport. It should, however, be noted that the calculation of compliance with the target in Article 3(4) differs from the calculation of transport's contribution to the Member State's overall national target for renewable energy.

For the transport target, and not for the overall target:

*— Among petroleum products, only petrol and diesel count towards the **denominator**. This means that the kerosene/jet fuel used in aviation and the fuel oil used in shipping do not count (though the diesel used by some trains and some inland waterway vessels does),*

*— Biofuels from wastes, residues, non-food cellulosic material and ligno-cellulosic material count double towards the **numerator**,*

*— Electricity from renewable sources used in road vehicles counts 2,5 times towards the **numerator and the denominator**.*

According to Article 3(4)(c) of Directive 2009/28/EC to calculate the contribution of electricity produced from renewable sources and consumed in electric vehicles, 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. For the estimation of the average share of electricity from renewable energy sources in the Community, Member States may use the future scenarios prepared by/for the European Commission ⁽¹²⁾.

As well as setting sectoral targets for 2020, Member States must also describe the trajectory that they expect the growth of renewable energy use in each sector to follow between 2010 and 2020. The sectoral renewable targets in electricity and heating and cooling and the sectoral trajectories are estimations.

Table 3 requires Member States to furnish the information referred to above.

When filling in the table, Member States will wish to draw on the more detailed breakdown of expected renewable energy use required by Table 9. Calculation Tables 4a and 4b provide guidance in preparing Table 3.

¹² For example, the scenario documented in Appendix 4, p. 287, in ‘Appendixes to Model-based Analysis of the 2008 EU Policy Package on Climate Change and Renewables’: http://ec.europa.eu/environment/climat/pdf/climat_action/analysis_appendix.pdf. In this scenario the EU- 27 average share of gross electricity production from renewable energy forms is 19.4 %, 24.6 % and 32.4 % for the years 2010, 2015 and 2020, respectively.

The Directive requires Member States to publish and notify to the Commission their forecast for the use of the flexibility measures by 31 December 2009. Member States will wish to draw on this forecast in filling in the relevant parts of Table 4a. Member States are not, however, required to use the same figures in their Action Plans as they gave in their forecast documents. In particular, they may wish to adjust the figures in the light of the information contained in other Member States' forecast documents.

Table 3: National 2020 target and estimated trajectory of energy from renewable sources in heating and cooling, electricity and transport
(Calculation Tables 4a and 4b are expected to guide the preparation of Table 3)

	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Renewable energy sources ¹³ Heating and cooling (%)	1.7 %	2.1 %	2.3 %	2.7 %	3.4 %	3.9 %	4.6 %	5.3 %	6.0 %	6.8 %	7.6 %	8.5 %
Renewable energy sources ¹⁴ Electricity(%)	3.2 %	4.0 %	4.4 %	5.4 %	6.5 %	7.7 %	8.9 %	9.7 %	10.4 %	11.1 %	11.5 %	11.8 %
Renewable energy sources ¹⁵ Transport(%)	0.0 %	2.1 % ¹⁶	1.3 %	1.8 %	2.4 %	3.2 %	3.8 %	4.4 %	5.4 %	6.5 %	8.3 %	10.0 %
Overall renewable energy sources share ¹⁷ (%)	0.9 %	2.2 %	2.9 %	2.9 %	3.9 %	3.9 %	5.4 %	5.4 %	7.5 %	7.5 %	9.2 %	11.0 %

¹³ Share of renewable energy in heating and cooling: gross final consumption of energy from renewable sources for heating and cooling (as defined in Articles 5(1)(b) and 5(4) of Directive 2009/28/EC) divided by gross final consumption of energy for heating and cooling. Line (A) from Table 4a divided by line (1) of Table 1.

¹⁴ Share of renewable energy in electricity: gross final consumption of electricity from renewable sources for electricity (as defined in Articles 5(1)(a) and 5(3) of Directive 2009/28/EC) divided by total gross final consumption of electricity. Row (B) from Table 4a divided by row (2) of Table 1.

¹⁵ Share of renewable energy in transport: final energy from renewable sources consumed in transport (cf. Article 5(1)(c) and 5(5) of Directive 2009/28/EC) divided by the consumption in transport of 1) petrol; 2) diesel; 3) biofuels used in road and rail transport and 4) electricity in land transport (as reflected in row 3 of Table 1). Line (J) from Table 4b divided by row (3) of Table 1.

¹⁶ For the biofuels in 2010, the compliance with the sustainability criteria was not required.

¹⁷ Share of renewable energy in gross final energy consumption. Row (G) from Table 4a divided by row (4) of Table 1.

<i>Of which from cooperation mechanism</i> ¹⁸ %	-	0.0 %	1.1 %	0.5 %	0.9 %	0.2 %	1.1 %	0.5 %	1.7 %	0.9 %		2.1 %
<i>Surplus for cooperation mechanism</i> ¹⁹ %	-	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %
As Part B of Annex I to the Directive			2011-2012	2013-2014	2015-2016	2017-2018						2020
			S 2005 + 20 % (S 2020-S 2005)	S 2005 + 30 % (S 2020-S 2005)	S 2005 + 45 % (S 2020-S 2005)	S 2005 + 65 % (S 2020-S 2005))						S 2020
Renewable energy sources minimum trajectory ²⁰ (%)			2.92 %	3.93 %	5.45 %	7.47 %						11.00 %
Renewable energy sources minimum trajectory (ktoe)			121.5	165.3	231.9	322.5						483.5

¹⁸ As percentage points of the total percentage of the renewable energy sources.

¹⁹ As percentage points of the total percentage of the renewable energy sources.

²⁰ As defined in Annex I.B to the Directive 2009/28/EC.

Table 4a: Calculation table for the renewable energy contribution of each sector to final energy consumption (ktoe)

	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
(A) Expected gross final consumption of RES for heating and cooling	19.6	25.5	27.8	33.6	42.0	48.4	57.0	65.7	75.1	85.7	96.2	107.8
(B) Expected gross final consumption of electricity from RES	18.0	22.0	24.2	29.8	35.5	42.2	48.5	53.5	57.6	62.1	64.8	67.1
(C) Expected final consumption of energy from RES in transport	2.1	43.4²¹	26.4	38.1	52.3	68.6	84.3	96.7	120.2	144.1	184.8	226.1
(D) Expected total RES consumption (22) (E) Expected transfer of renewable energy sources to other Member States	39.8	89.0	76.2	99.0	127.0	156.0	186.1	211.0.	246.8	284.3	336.9	390.7
(E) Expected transfer of renewable energy sources to other Member States	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(F) Expected transfer of renewable energy sources from other Member States and 3rd countries	-	0.0	44.8	22.8	37.8	9.8	45.0	21.6	74.5	39.2	66.1	92.9
(G) Expected renewable energy sources consumption adjusted for target (D) - (E) + (F)	39.8	89.0	121.1	121.8	164.8	165.8	231.1	232.7	321.3	323.5	403.0	483.5

²¹ For the biofuels in 2010, the compliance with the sustainability criteria was not required.

²² According to Article 5(1) of Directive 2009/28/EC gas, electricity and hydrogen from renewable energy sources shall only be considered once. No double counting is allowed.

Table 4b: Calculation table for the renewable energy in transport share (ktoe)

	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
C)) Expected consumption of energy from renewable sources in the transport sector²³	2.1	43.4²⁴	26.4	38.1	52.3	68.6	84.3	96.7	120.2	144.1	184.8	226.1
H) Expected consumption of electricity from renewable energy sources in the road transport²⁵	0.0	0.0	0.1	0.1	0.2	0.3	0.4	1.2	2.0	3.0	4.0	5.1
I) Expected consumption of biofuels from wastes, residues, non-food cellulosic and lingo-cellulosic material in transport port²⁶	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(J) Expected renewable energy sources contribution to transport for the RES-T target: (C) + (2.5 - 1) x (H) + (2 -	2.1	43.4	26.5	38.3	52.6	69.0	84.8	98.4	123.2	148.5	190.8	233.7

²³ Containing all renewable energy sources used in transport including electricity, hydrogen and gas from renewable energy sources, and excluding biofuels that do not comply with the sustainability criteria (cf. Article 5(1) last subparagraph). Specify here actual values without using the multiplication factors.

²⁴ For the biofuels in 2010, the compliance with the sustainability criteria was not required.

²⁵ Specify here actual values without using the multiplication factors.

²⁶ Specify here actual values without using the multiplication factors.

4. MEASURES FOR ACHIEVING THE TARGETS

4.1. Overview of all policies and measures to promote the use of energy from renewable resources

Table 5: Overview of all policies and measures

Name and reference of the measure	Type of measure (*)	Expected result (**)	Targeted group and or activity (***)	Existing or planned	Start and end dates of the measure
1. The reduction of possible administrative hurdles should be revised.	Regulatory	Increase in the installed capacity and the energy generation from RE	Public administration	Exists in part already	Start: January 2010 End: December 2011
2. At a local municipal level, the extent to which the integration of renewable energies and energy efficiency can be tied into the municipal building regulations is to be revised.	Regulatory	Increase in the installed capacity and the energy generation from RE	Local authorities	Planned	Start: September 2010 End: December 2011
3. It is planned to make the necessary guidelines available to the local authorities for the planning, designing, building and refurbishing of industrial or residential areas using equipment and systems for the use of renewable energy sources for heating, cooling and electricity, including district heating and cooling.	Informative, normative, further training	Change in attitude Increase in the installed capacity and the energy generation from RE	Local authorities	Planned	Start: September 2010 End: December 2011
4. The extent to which measures in the area of training for the employees processing approval, certification and authorisation applications for plants for the generation of energy from renewable sources is needed and how this can be implemented, if applicable, is to be revised.	Informative, further training	Change in attitude Increase in the installed capacity and the energy generation from RE	Public administration	Planned	Start: January 2011 End: December 2012
5. A possible obligation to use renewable energies in buildings is to be revised.	Regulatory	Increase in the installed capacity and the energy generation from RE	End users	Planned	Start: January 2011 End: December 2012
6. The extent to which guides, templates for tender texts and supply contracts for central supply systems from renewable energies can be beneficial to the development of these systems is to be revised.	Informative, normative, further training	Change in attitude Increase in the installed capacity and the energy generation from RE	Public administration	Planned	Start: September 2010 End: December 2011
7. Pioneering role of the state with new construction. In the planning of public buildings, the use of renewable energies is to be revised. Furthermore so-called plus energy houses are to be built and used as models.	Informative, infrastructural	Increase in the installed capacity and the energy generation from RE	Public administration	Exists	Start: 2008

8. Pioneering role of the state with existing construction: In the next few years, the possible use of renewable energies should be looked at for each building.	Informative, infrastructural	Increase in the installed capacity and the energy generation from RE	Public administration	Exists	Start: 2008
9. <i>Myenergy</i> is the Luxembourg point of contact with regard to information and basic advice in the areas of energy efficiency and renewable energy sources. It will increase its awareness-raising and basic advising activities in the area of renewable energies.	Informative	Change in attitude Increase in the installed capacity and the energy generation from RE	Investors, end users, planners, trades people, public administration	Exists	Start: January 2009
10. <i>Myenergy</i> aims to build up a comprehensive network of info points by the year 2012 so that each citizen in Luxembourg has local access to a point of contact for questions in the areas of energy efficiency and renewable energies.	Informative	Change in attitude Increase in the installed capacity and the energy generation from RE	Citizen	Exists in part already	Start: January 2009
11. The training offers in the area of renewable energies are to be expanded especially planning and crafts.	Further training, informative	Increase in the installed capacity and the energy generation from RE	Planners, tradespeople	Planned	Start: January 2011 End: December 2012
12. The cluster of environmental technological operations guarantees a far-reaching accompaniment in the environmental technology operations with branches and investments in Luxembourg.	Informative	Increase in the installed capacity and the energy generation from RE	Companies, research institutes, public administration	Exists	Start: February 2009
13. Individual communities and associations of municipal authorities regularly organise information and aware-raising campaigns on climate protection and associated topics such as, for example, energy saving and using renewable energy sources. <i>Myenergy</i> is to increase its cooperation here with the local authorities.	Informative	Change in attitude	Citizen	Exists	Start: 2009
14. Every year the Chamber of Skilled Trades (Chambre des Métiers) holds a further education course for tradespeople where, on successful completion, they receive a quality label in the areas of renewable energy and energy efficiency – the ‘Énergie fir d’Zukunft’ label.	Further training, informative	Increase in the installed capacity and the energy generation from RE	Trades people	Exists	Start: 2001
15. The professional association of architects and the consulting engineers (OAI) organise a training cycle “Building and energy”.	Further training, informative	Increase in the installed capacity and the energy generation from RE	Planners	Exists	Start: 2003
16. It is to be revised how the information over the net benefits, the costs and energy efficiency of plants and systems which use renewable energy sources for heating, cooling and electricity, can be best made public to the end users.	Informative	Change in attitude	End users	Planned	Start: September 2010 End: December 2011

17. A certification system for tradespeople will be implemented which will take Luxembourg's conditions and situations into consideration as well as the already existing initiatives.	Possibly regulatory	Increase in the installed Capacity and the energy generation from renewable	Tradespeople	Planned	Start: January 2011 End: December 2012
18. The pilot project for intelligent networks and meters has already been initiated by the system operator CREOS Luxembourg S.A. This is to be evaluated in order to, among other things, be able to make decisions on further steps to improve the integration of renewable energy in the power supply network.	Infrastructural	Change in attitude	System operators	Exists in part already	Start: 2009
19. Within the framework of the improvement of the national supply security as well as the increased integration of Luxembourg into the European power supply network, different approaches for connecting Luxembourg to the transportation network of the neighbouring countries is to be revised which would benefit from the development of renewable energies in the power supply network.	Infrastructural	Increase in the installed capacity and the energy generation from RE	System operators	Exists in part already	Start: 2009
20. It is to be revised if an adjustment in the current valid regulations with regard to the allocation of costs for connections and technical adaptations is needed for the power supply network infrastructure.	Regulatory	Increase in the installed capacity and the energy generation from RE	Public administration	Planned	Start: January 2011 End: June 2011
21. The extent to which it is necessary to take measures to avoid limiting the feeding-in of electricity from renewable energy source is to be revised.	Regulatory	Increase in the installed capacity and the energy generation from RE	Public administration	Planned	Start: January 2013 End: December 2013
22. The preparation of an analysis of the gas network infrastructure with regard to biogas feed-ins is to be revised.	Infrastructural	Increase in the installed capacity and the energy generation from RE	Investors, gas system operators	Planned	Start: January 2013 End: December 2013
23. The type of implementation of sustainability criteria for biofuels and other bio liquids is being checked with regard to the Luxembourg law.	Regulatory	Change in attitude	Public administration, Mineral companies	Exists in part already	Start: January 2010 End: December 2010
24. Investment assistance for private individuals in the area of electricity and heating generation from renewable energy sources is granted. This assistance is to be adjusted to the targets within the framework of the implementation of this plan.	Financial, regulatory	Increase in the installed capacity and the energy generation from RE	Private individuals	Exists	Start: 2001

25. Investment assistance for companies is granted within the framework of the 'Régimes d'aides à la protection de l'environnement et à l'utilisation rationnelle des ressources naturelles'. The measures apply to all technologies in the area of energy production based on renewable energy sources, including the production of sustainable biofuels.	Financial, regulatory	Increase in the installed capacity and the energy generation from RE	Companies	Exists	Start: 2004
26. Investment assistance for small and medium-sized companies is granted within the framework of the 'Régimes d'aides en faveur du secteur des classés moyennes'. The measures apply to all technologies in the area of energy production based on renewable energy sources.	Financial, regulatory	Increase in the installed capacity and the energy generation from RE	Small and medium-sized companies	Exists	Start: 2004
27. Investment assistance within the framework of the 'Fonds pour la protection de l'environnement' is granted. The measures apply to the area electricity and heating generation from renewable energy sources. The criterion for the awarding of the assistance is to be adjusted within the framework of the implementation of this plan.	Financial, regulatory	Increase in the installed capacity and the energy generation from RE	Local authorities	Exists	Start: 2005
28. Investment assistance for agricultural operations is granted within the framework of the 'Soutien au Développement rural'. The measures apply to investments in the area of electricity, heating and biofuels based on renewable energy sources.	Financial, regulatory	Increase in the installed capacity and the energy generation from RE	Agricultural businesses	Exists	Start: 2007
29. Feed-in payments for electricity from renewable energy sources. The amount and structure of the feed-in payments are to be adjusted within the framework of the implementation of this plan if necessary.	Financial, regulatory	Increase in the installed capacity and the energy generation from RE	Plant operators	Exists	Start: 1994
30. There is currently an obligation in effect for all diesel and petrol fuels which should lead to an increased use of energy from renewable sources in the transport sector. The admixture obligation is to be promptly implemented in order to expand the sustainability criteria contained in the Directive 2009/28/EC.	Regulatory	Increase in the generation from RE	Mineral companies	Exists	Start: 2007
31. In excavated areas, the planting of trees using short rotation forestry is to be supported.	Financial, cooperative	Increase in the installed capacity and the energy generation	Farmers	Planned	Start: January 2013 End: December 2015
32. It is to be revised if the use of old and scrap wood can be improved and if the incentives, especially investment assistance and feed-in payments, are adequate for biomass projects based on old and scrap wood.	Cooperative, informative, financial	Change in attitude	Waste syndicates, companies	: Planned	Start: January 2011 End: December 2012

33. It is to be revised if the collection of organic waste (with regard to infrastructure, organisation...) can be improved and if the current incentives especially investment incentives and feed-in payments, are adequate for biomass projects based on organic waste.	Infrastructural, cooperative, informative, financial	Change in attitude	Waste syndicates, households, Companies with a high percentage of organic waste (food production, HoReCa,...)	Planned	Start: January 2011 End: December 2012
34. The support of biogas production and feeding into the natural gas system is planned as soon as possible. The 'Projet de Règlement grand- ducal relatif à la production, la rémunération et la commercialisation de biogaz' is currently in the regulatory procedure stage.	Financial, regulatory	Increase in the installed capacity and the energy generation from RE	Investors	Planned	Start: 2010
35. Forest mobilisation, especially in privately owned forests, is to be improved. For this concrete work and analyses have been initiated with associations of private forest owners.	Financial, cooperative, infrastructural	Increase in the installed capacity and the energy generation from RE	Private forest owner	Planned	Start: September 2010 End: December
36. The preparation of an analysis on the interactions between the different biomass uses and area use (among others, competition analyses) is checked.	Cooperative	Change in attitude	Farmers, forest owners, food industry, wood industry, paper industry,...	Planned	Begins: January 2014 End:
37. Using an analysis of the pre-assessment of the individual Member States, the potential countries were identified with which the use of cooperative mechanisms might come into question. With several of these countries, concrete discussions have been held in order to sound out possible cooperation in achieving Luxembourg's targets. The corresponding contacts are to be more intensively pursued.	Cooperative	Increase in the generation from RE	Public administration	Exists	Start: 2009

(*) Indicate if the measure is (predominantly) regulatory, financial or soft (i.e. information campaign).

(**) Is the expected result behavioural change, installed capacity (MW; t/year), energy generated (ktoe)?

(***) Who are the targeted persons: investors, end users, public administration, planners, architects, installers, etc.? or what is the targeted activity/sector: biofuel production, energetic use of animal manure, etc.)?

4.2. Specific measures to fulfil the requirements under Articles 13, 14, 16 and Articles 17 to 21 of Directive 2009/28/EC

4.2.1. Administrative procedures and spatial planning (Article 13(1) of Directive 2009/28/EC)

When answering the following questions, Member States are requested to explain the current national, regional and local rules concerning the authorisation, certification and licencing procedures applied to plants and associated transmission and distribution network infrastructure for the production of electricity, heating or cooling from renewable sources, and to the process of transformation of biomass into biofuels or other energy products. Where further steps are needed to ensure that procedures are proportionate and necessary, Member States are requested also to describe planned revisions, expected results and the authority responsible to carry out such revisions. When information is technology specific, please indicate it. When regional/local authorities have a substantial role, please also explain it.

(a) List of existing national and, if applicable, regional legislation concerning authorisation, certification, licencing procedures and spatial planning applied to plants and associated transmission and distribution network infrastructure:

‘Loi modifiée du 10 juin 1999 relative aux établissements classés’;

‘Règlement grand-ducal modifié du 16 juillet 1999 portant nomenclature et classification des établissements classés’;

‘Loi modifiée du 19 janvier 2004-concernant la protection de la nature et des ressources naturelles;-modifiant la loi modifiée du 12 juin 1937 concernant l'aménagement des villes et autres agglomérations importantes;- complétant la loi modifiée du 31 mai 1999 portant institution d'un fonds pour la protection de l'environnement ‘;

‘Règlement grand-ducal modifié du 14 septembre 2000 concernant les études des risques et les rapports de sécurité’;

‘Règlement grand-ducal modifié du 7 mars 2003 concernant à l'évaluation des incidences de certains projets publics et privés sur l'environnement’;

‘Loi modifiée du 22 mai 2008 relative à l'évaluation des incidences de certains plans et programmes sur l'environnement’;

‘Règlement grand-ducal du 21 juillet 2009 déterminant a) les conditions d'aménagement et d'exploitation visant l'environnement humain et naturel, telles que la protection de l'air, de l'eau, du sol, de la faune et de la flore, la lutte contre les vibrations, l'utilisation rationnelle de l'énergie, la prévention et la gestion des déchets; b) les conditions d'aménagement et d'exploitation relatives à la sécurité du public et du voisinage en général ainsi qu' à la sécurité et l'hygiène sur le lieu de travail, la salubrité et l'ergonomie; concernant l'antenne ferroviaire Belval-Usines - Belvaux-Mairie’;

‘Loi du 2 août 2006 modifiant la loi modifiée du 21 juin 1976 relative à la lutte contre le bruit’;

‘Règlement grand-ducal du 7 novembre 2007 modifiant le Règlement grand-ducal modifié du 13 février 1979 concernant le bruit dans les alentours immédiats des établissements et des chantiers’;

‘Loi du 19 décembre 2008 relative à l'eau’.

(b) Responsible Ministry(/ies)/authority(/ies) and their competences in the field:

Ministry for Sustainable Development and Infrastructure (‘Ministere du Développement durable et des Infrastructures’): Permits for environmental areas;

Environmental Administration (‘Administration de l'Environnement’): Authorisation procedures in environmental areas
Ministry of Labour and Employment (‘Ministere du Travail et de l'Emploi’): Permits in the area of safety and working conditions;

Labour inspectorates (‘Inspection du Travail et des Mines’): Authorisation procedures in the area of safety and working conditions;

Ministry of the Interior and Greater Regions (‘Ministere de l'Intérieur et de la Grande Région’): Spatial planning;

Municipal governments: communal spatial planning and authorisation;

Water management (‘Administration de la Gestion de l'Eau’): Permits relating to water management and water protection.

(c) Revision foreseen with the view to take appropriate steps as described by Article 13(1) of Directive 2009/28/EC by: 31.12.2011

Within the framework of the implementation of Directive 2009/28/EC, the reduction of possible administrative hurdles in all areas is to be revised. The involved ministries and administrations, and if applicable, communities, should be integrated here. Within the framework of the measures for administrative simplification, a series of authorisation procedures are currently being revised for their effectiveness. The implementation of identified, necessary simplifications, especially in terms of commodo-incommodo [decision-making procedure] and the nature conservation legislation is planned as soon as possible.

(d) Summary of the existing and planned measures at regional / local levels (where relevant):

At the municipal level the extent to which the integration of renewable energies and energy efficiency can be anchored into the municipal building regulations should be examined. Incentives should be provided here in order to accelerate the equipping and furnishing of municipal buildings and other infrastructures with renewable energies is to be revised.

- (e) **Are there unnecessary obstacles or non-proportionate requirements detected related to authorisation, certification and licencing procedures applied to plants and associated transmission and distribution network infrastructure for the production of electricity, heating or cooling from renewable sources, and to the process of transformation of biomass into biofuels or other energy products? If so, what are they?**

In the context mentioned, selective obstacles or requirements have been determined in Luxembourg which have, to a certain extent, limited the development of renewable energies. The majority of the time, this involves conflicts between the development of renewable energies and the nature and species protection. In terms of implementation of the Action Plan, it has been revised in detail whether or not the current situation, and especially the current conflict between nature protection and renewable energies, can be improved through specific measures.

- (f) **What level of administration (local, regional and national) is responsible for authorising, certifying and licensing renewable energy installations and for spatial planning? (If it depends on the type of installation, please specify.) If more than one level is involved, how is coordination between the different levels managed? How will coordination between different responsible authorities be improved in the future?**

National level: The national authorities are responsible for authorisation and licencing of the generation of energy from renewable sources. In this regard, the former also ensures the corresponding coordination, if needed, at the local level.

Local level: The respective communities are responsible for the spatial planning as well as the building regulations. This applies, for example, to photovoltaic and solar thermal systems which are to be installed on building roofs.

The coordination between the authorities should be improved in those cases where this is necessary by a still to be determined authority.

- (g) **How is it ensured that comprehensive information on the processing of authorisation, certification and licensing applications and on assistance to applicants made available? What information and assistance is available to potential applicants for new renewable energy installations on their applications?**

Comprehensive information on authorisation, certification and licencing applications as well as assistance can be seen at www.guichet.lu. Conditions, targets, history, process steps and a time line for the application as well as relevant authorities are listed here. The entire process is illustrated with practical examples.

Additionally the involved authorities provide the necessary information to applicants, also upon request and give further information on the steps to be taken.

The ‘Centre de Recherché des Technologies de l'Environnement (CRTE)’ [Centre for Research of Technologies for the Environment] offers assistance to applicants. Furthermore *myenergy* also assists as a point of contact for information in the areas of renewable energies and energy efficiency.

- (h) How is horizontal coordination facilitated between different administrative bodies, responsible for the different parts of the permit? How many procedural steps are needed to receive the final authorisation/ licence/permit? Is there a one-stop shop for coordinating all steps? Are timetables for processing applications communicated in advance? What is the average time for obtaining a decision for the application?**

At the national level, the coordination of the authorisation processes is guaranteed within the framework of the ‘Loi modifiée du 10 juin 1999 relative aux établissements classés’ by the Environmental Administration of the Ministry for Sustainable Development and Infrastructure. The different process steps are listed in the ‘Loi modifiée du 10 juin 1999 relative aux établissements classés’. The time line is dependent on the respective class 1, 2, 3, 3A, 3B or 4 of the project which in the ‘Règlement grand-ducal modifié du 16 juillet 1999 portant nomenclature et classification des établissements classés’ is defined. The respective time periods are listed in the following table:

	Process steps	Classes		
		1	2	3, 3A, 3B
Responsible authorities	Response to submittal of application	~2 months	~2 months	~2 months
	Response to submittal of possible additional information	~1 month	~1 month	~1 month
	Maximum duration before publication phase	~2 - 3 weeks	~1 - 2 weeks	Not affected
	Duration of the publication in the municipality	~2 weeks	~2 weeks	
	Duration of the feedback after publication	~1 month	1 month	1 month
	Duration until signature of issuance	~1 month ½		
	Maximum total duration without additional information	~5 months ½	~4 months	~3 months
Applicant	Response to possible additional information	~6 months	~6 months	~6 months
	Additional authorisable extension	~3 months	~3 months	~3 months

Objects in class 4 require only a message to the responsible office whose receipt is confirmed by the latter.

The coordination of the nature protection authorisations within the framework of the 'Loi modifié du 19 janvier 2004 concernant la protection de la nature et des ressources naturelles' has been taken over by the environmental department ('Département de l'environnement') at the Ministry of Sustainable Development and Infrastructure.

The building permits are issued by the respective responsible municipal administration with regard to the local building regulations valid here. Such procedures are generally decoupled from the national authorisations mentioned and the coordination for this is also done at the local level.

- (i) **Do authorisation procedures take into account the specificities of the different renewable energy technologies? If so, please describe how. If they do not, do you envisage taking them into account in the future?**

Yes, the 'Règlement grand-ducal modifié du 16 juillet 1999 portant nomenclature et classification des établissements classés' divides the applications into different classés (1, 2, 3, 3A, 3B or 4). Each class has its own customised authorisation processes which take the respective technology into account.

- (j) **Are there specific procedures, for example, simple notification, for small-scale, decentralised installations (such as solar panels on buildings or biomass boilers in buildings)? If so, what are the procedural steps? Are the rules publicly available to citizens? Where are they published? Is the introduction of simplified notification procedures planned in the future? If so, for which types of installation / system? (Is net metering possible?)**

For small, decentralised plants, there are at the local level simplified processes (for example, with solar systems on building roofs). For such systems, for the most part, no national authorisation processes are necessary.

At a national level, there are simplified processes with regard to the different classés which have been established in 'Règlement grand-ducal modifié du 16 juillet 1999 portant nomenclature et classification des établissements classés'. Thus objects in class 4 only require a message to the responsible office which the latter then confirms. The different process steps in the classés 1, 2, 3, 3A, 3B are described on the following Internet sites in detail: <http://www.environnement.public.lu/établissementsclassés/procedures/index.html>

The general process steps are listed in the following table:

Process steps
Submittal of the application
Response to application
Submittal of possible additional information
Response to possible additional information
Publication in the municipality
Feedback after publication
Signing of the issuance

- (k) **Where are the fees associated with applications for authorisation/licences/ permits for new installations published? Are they related to the administrative costs of granting such permits? Is there any plan to revise these fees?**

At the local level fees are charged for authorisation or licencing applications for plants generating energy from renewable sources. The fees are reasonable with regard to the costs of the project. Currently there is no revision of the fees planned. At the national level, no direct fees are charged within the framework of the usual authorisation procedures.

- (l) **Is official guidance available to local and regional administrative bodies on planning, designing, building and refurbishing industrial and residential areas to install equipment and systems using renewable energy sources in electricity and heating and cooling, including in district heating and cooling? If such official guidance is not available or insufficient, how and when will this need to be addressed?**

It is planned to provide the local administrative bodies with the necessary guidance for planning, designing, building and refurbishing of industrial or residential areas to install systems and equipment for the use of renewable energy sources for heating, cooling and electricity including district heating and cooling. This is to be implemented within the framework of the directive's implementation.

- (m) **Are there specific trainings for case handlers of authorisation, certification and licencing procedures of renewable energy installations?**

Currently there is no targeted training for the case handlers of authorisation, certification and licencing applications for plants that

generate energy from renewable sources; however the case handlers in Luxembourg have the possibility to generally improve their special skills in the area of renewable energies through the public further training opportunities. Within the framework of the implementation of the directive, it is to be revised as to what extent further concrete measures in this area are necessary and how these, if necessary, can be implemented.

4.2.2 Technical specifications (Article 13(2) of Directive 2009/28/EC)

- (a) **To benefit from support schemes do renewable energy technologies need to meet certain quality standards? If so, which installations and what quality standards? Are there national, regional standards that go beyond European standards?**

In the case of investment incentives which are provided for in the 'Règlement grand-ducal du 20 avril 2009 instituant un régime d'aides pour la promotion de l'utilisation rationnelle de l'énergie et la mise en valeur des énergies renouvelable', the following technology-specific quality requirements must be met:

SOLAR THERMAL ENERGY

Thermal solar system for non-potable water heating

Use	Conditions
Single-unit house	Heat meter
Multi-unit house	Heat meter

Thermal solar system for non-potable water heating and heating support

Use	Conditions
Single-unit house	Heat meter
Multi-unit house	Heat meter

PHOTOVOLTAIC

Conditions
Assembly on roof or facade or integrated into the building shell, Maximum eligible peak output: 30 kW _i , per location

WOOD HEATING

Central heating with wood pellets, wood chip heating or straw

Use	Conditions
Single-unit house	Power and combustion control, automatic feeding and ignition
Multi-unit house	Power and combustion control, automatic feeding and ignition

Wood pellet oven (with heat extraction in the heating circuit of the central heating)

Use	Conditions
Single-unit house	Heat extraction in the heating circuit • 50%, Power and combustion control

Central split log heating

Use	Conditions
Single-unit house	Power and combustion control, Buffer • 55 l/kW
Multi-unit house	Power and combustion control, Buffer • 55l/kW

The fulfilment of the following criteria is to be verified with a certificate from the heating technician:

- CO emissions • 250 mg/m³ (nominal load case)
- Particle emissions • 50mg/m³ (nominal load case)
- Boiler effectiveness • 90% or combustion technological efficiency of wood pellet ovens • 90%

HEAT PUMPS

Geothermal heat pump (ground probes or geothermal collectors)

Use	Conditions
Single-unit house	Use only for heating purposes COP value B0/W35 • 4.2 max. flow temperature: 35°C
Multi-unit house	Use only for heating purposes COP value B0/W35 • 4.2 max. flow temperature: 35°C

Air-source heat pump

Use	Conditions
Single-unit house	Use only for heating purposes geothermal heat exchanger must be upstream COP value A7/W35• 3.3, max. flow temperature: 35°C
Multi-unit house	Use only for heating purposes geothermal heat exchanger must be COP value A7/W35• 3.3, max. flow temperature: 35°C

MICRO CHP combined heat and power plants, Combustion motor, Stirling motor, fuel cells

Conditions
Electrical rated power between 1 and 6 kW, Fuel or heating source from renewable energies (except for the fuel cell), annual use efficiency • 85%, annual operating hours • 5000 hours, Dimensioning according to VDT 3985 and NMI 2067-sheet 7; base load not larger than 30% of the maximum thermal building load, Joint use of heating and electricity, Use of an emergency cooler not allowed.

4.2.3 Buildings (Article 13(3) of Directive 2009/28/EC)

Please note that when referring to increasing the use of renewable energy sources in buildings, the supply of renewable electricity from the national grid should not be considered. The focus here is on increasing local supply of heat and/ or electricity to individual buildings. The direct supply of heat or cooling through district heating and cooling in buildings could also be taken into account.

(a) Reference to existing national and regional legislation (if any) and summary of local legislation concerning the increase of the share of energy from renewable sources in the building sector:

The effective or the national statutory provisions found in the legal and regulatory procedures are as follows:

‘Règlement grand-ducal modifié du 30 novembre 2007 concernant la performance énergétique des batiments d'habitation’;

‘Projet de Règlement grand-ducal concernant la performance énergetique des bâtiments fonctionnels et modifiant le régime grand-ducal modifié du 30 novembre 2007 concernant la performance énergetique des batiments d'habitation’;

‘Règlement grand-ducal du 20 avril 2009 instituant un régime d'aides pour la promotion de ('utilisation rationnelle de l'energie et la mise en valeur des énergies renouvelables’;

‘Loi du 18 février 2010 relative à un régime d'aides à la protection de l'environnement et à l'utilisation rationnelle des ressources naturelles’;

‘Loi du 30 juin 2004 portant creation d'un cadre général des régimes d'aides en faveur du secteur des classés moyennes’;

‘Circulaire du 20 avril 2005 concernant le fonds pour la protection de l'environnement’;

‘Règlement grand-ducal du 8 février 2008 relatif à la production d'électricité basée stir les sources d'énergie renouvelables’.

The legal provisions mentioned include both a financial incentive programme and also indirect measures which are covered by the respective energy efficiency decrees for residential and commercial buildings.

(b) Responsible Ministry(/ies) / authority(/ies):

The responsible ministries/authorities are listed as follows:

Ministry of Economic Affairs and Foreign Commerce (‘Ministere de l'Economie et du Commerce exterieur’)

Ministry for Sustainable Development and Infrastructure (‘Ministere du Développement durable et des Infrastructures.

Ministry for Small Businesses and Tourism (‘Ministère des Classés movennes et du Tourisme’)

(c) Revision of rules, if any, planned by: 31st December 2012

Since introduction of a new method of calculation completed in 2007, concerning energy verification and certification in the building area which pursues a primary energy approach, the use of renewable energy in buildings has been positively evaluated because better energy classés can be obtained in the energy certificate using renewable

energy. Within the framework of the implementation of Directive 2009/28/EC, the question of if and when, from which point in time can an obligation to use renewable energies in building be an advantage for the fulfilment of the renewable energies target, is to be revised.

(d) Summary of the existing and planned measures at regional / local levels:

The extent to which guides, templates for tender texts and supply contracts for central supply systems from renewable energies can be beneficial to the development of these systems is to be revised.

(e) Are there minimum levels for the use of renewable energy in building regulations and codes? In which geographical areas and what are these requirements? (Please summarise.) In particular, what measures have been built into these codes to ensure the share of renewable energy used in the building sector will increase? What are the future plans related to these requirements / measures?

Currently there are no minimum levels specified for the use renewable energy in the building regulations and codes planned.

The specific properties of renewable energy sources have been taken into account within the framework of the 'Règlement grand-ducal du 30 novembre 2007 concernant la performance énergétique des bâtiments d'habitation' in the calculation of the total primary energy parameters and the total CO₂ emission parameters. Consequently, an indirect, positive incentive occurs here for the use and increase of renewable energy in buildings.

Within the framework of the implementation of Directive 2009/28/EC, the question of if and when, from which point in time can an obligation to use renewable energies in building be an advantage for the fulfilment of the renewable energies target, is to be revised.

(f) What is the projected increase of renewable energy use in buildings until 2020? (If possible differentiating between residential –“single-unit house” and “multiple unit”, commercial, public and industrial.) (To answer this question you may use a table as Table 6 below. Data could be given yearly, or for selected years. Both heating and cooling and electricity consumption from renewable energy sources should be included.)

Table 6 Estimated share of renewable energy in the building sector (%)

	2005	2010	2015	2020
Residential	-	-	-	-
Commercial	-	-	-	-
Public	-	-	-	-
Industrial	-	-	-	-
TOTAL	2.9 %	4.0 %	7.7 %	15.2 %

There is currently no data available that differentiates residential buildings (single-unit houses, multi-unit houses), commercial buildings, public buildings and industrial buildings. The estimated share includes only the consumption of heating (and if applicable, cooling) from renewable energy sources. The decentrally generated renewable heating was integrally considered and only half of the grid-connected, renewable heating was factored in.

- (g) **Have obligations for minimum levels of renewable energy in new and newly refurbished buildings been considered in national policy? If so, what are these levels? If not, how will the appropriateness of this policy option be explored by 2015?**

Discussions on this subject are being held currently in Luxembourg. In any event, the extent to which such an option is practical and/or necessary for the achievement of the targets established in the Directive is to be in place by 2015.

- (h) **Please describe plans for ensuring the exemplary role of public buildings at national, regional and local level by using renewable energy installations or becoming zero energy buildings from 2012 onwards? (Please take into account the requirements under the EPBD).**

The government of Luxembourg has already initiated several actions to ensure the exemplary role of public buildings and plans to expand these actions. At the same time, these measures also represent an important component within the framework of the Luxembourg climate protection policy.

Public buildings – new construction: These measures are targeted on the State taking a leading role in new construction where the best possible energy efficiency is to be used. During the planning of public building, an energy concept is prepared and the possibility of a connection to the CHP and/or the use of renewable energies in the building is revised. Additionally, the government programme stipulates that beginning in 2010, all public buildings as well as, if applicable, buildings which are owned or subsidised by the State are to be built according to the low-energy house standard. In addition, so-called plus energy houses are to be realised as demonstration objects.

Public buildings – existing structures: Luxembourg has launched a building modernisation programme for public structures. From the approximately 1,500 buildings which are currently owned by the State, approximately 30% are in a condition which lends themselves to an energy-saving refurbishment. For a step-by-step refurbishment of the old building structures, around 30

billion Euros have been set aside from the Kyoto funds for energy-saving measures. In the next few years, an energy balance is to be prepared for each building (as well as checking for the possible use renewable energies).

In the past few years, an impressive number of energy efficient public new constructions have been built and several public building have been refurbished using energy-saving measures. In the buildings mentioned, a greater emphasis has also been placed on the use of renewable energies.

At the local level, the number of energy efficient new public buildings is increasing which increasingly fall back on renewable energies (mostly with thermal solar systems and decentralised biomass use in the form of wood chip or pellet heating systems).

- (i) **How are energy efficient renewable energy technologies in buildings promoted? (Such measures may concern biomass boilers, heat pumps and solar thermal equipment fulfilling eco-label requirements or other standards developed at national or Community level [cf. text of Article 13(6)]).**

Within the framework of the ‘Règlement grand-ducal du 20 avril 2009 instituant un régime d'aides pour la promotion de l' utilisation rationnel le de renergie et la mise *en* valeur des energies renouvelables’, investment incentives for the following energy efficient technologies for the use of renewable energies in buildings are provided:

SOLAR THERMAL SYSTEMS

Thermal solar systems for non-potable water heating

Use	Assistance (%)	Maximum (€)
Single-unit house	50	3000
Multi-unit house	50	3000 / flat, • 15 000 / Multi-unit house

Thermal solar systems for non-potable water heating and heating support

Use	Assistance (%)	Maximum (€)
Single-unit house	50	5000
Multi-unit house	50	5000 / flat, • 15 000 / Multi-unit house

PHOTOVOLTAIC

Assistance (%)	Maximum (€kW _p)
30	1650

WOOD HEATING

Central heating with wood pellets, wood chip heating or straw

Use	Assistance (%)	Maximum (€)
Single-unit house	30	4000
Multi-unit house	30	4000 / flat, • 20,000 / Multi-unit house

Wood pellet oven (with heat extraction in the heating circuit of the central heating)

Use	Assistance (%)	Maximum (€)
Single-unit house	30	2500

Central split log heating

Use	Assistance (%)	Maximum (€)
Single-unit house	25	2500
Multi-unit house	25	2000 / flat, • 10 000 I Multi-unit house

HEAT PUMPS

Geothermal heat pump (earth probes or ground collectors)

Use	Assistance (%)	Maximum (€)
Single-unit house	40	6000
Multi-unit house	40	4000 / flat, • 20 000 / Multi-unit house

Air-source heat pump

Use	Assistance (%)	Maximum (€)
Single-unit house	40	3000
Multi-unit house	40	2000 / flat, • 10 000 / Multi-unit house

MICRO CHP

Combustion motor, Stirling motor, fuel cells

Assistance (%)	Maximum (€)
25	3000

4.2.4. Information provisions (Articles 14(1), 14(2) and 14(4) of Directive 2009/28/EC)

Current and future information and awareness raising campaigns and programmes, as well as planned revisions, and expected results have to be described. Member States should also indicate which responsible authority will monitor and review the effects of the programmes. When regional / local authorities have a substantial role, please also indicate and summarise it.

- (a) **Reference to existing national and or regional legislation (if any) concerning information requirements according to Article 14 of Directive 2009/28/EC:**
- (b) **Responsible body/(ies) for dissemination of information at national / regional /local levels:**

For the dissemination of information at the national/regional/local levels, *myenergy* serves as a national structure for information and basic advising in the areas of renewable energies and energy efficiency. The portal www.guichedu as well as several communities and local authority associations, who do this on their own initiative, also disseminate information.

- (c) **Summary of the existing and planned measures at regional / local levels (where relevant):**

1. *Myenergy* is the Luxembourg point of contact with regard to information and basic advising in the areas of energy efficiency and renewable energy sources. *myenergy* provides interested actors information on its Internet website www.mvenergy.lu, in its information brochures, through its hotline, through thematic lectures, through its information desk at events, through “Info days” as well as through individual advising discussions. Furthermore *myenergy* plans intensified campaigns and events to gain acceptance for and enquiry into the use of renewable energy carriers as well as an increase in the awareness raising and basic advising activities in the area of renewable energies.
2. *Myenergy* “Infopoints”: An “Infopoint” is a regional support point from *myenergy*. Several communities are pooled into an “Infopoint”. A nationwide network of “Infopoints” is for *myenergy* an important instrument in order to reach citizens and target groups with its activities in the entire country quickly and effectively. With the help of a nationwide network of “Infopoints”, *myenergy* can fulfil its role of providing awareness raising measures and information of the same quality for the whole country. By 2012, *Myenergy* is striving to expand its nationwide network of “Infopoints” so that every Luxembourg citizen has available a regional point of contact for questions concerning energy efficiency and renewable energies. The work in an “Infopoint” consists of two pillars: On the one hand, the basic advising itself and on the other, the awareness raising and information.

3. The training offer in the area of renewable energies is to be expanded especially with planners and installers. The aim here is to extend the training in the area of low energy and passive houses which should also, in part, cover the area of renewable energies.
4. Cluster EcoDev: Since February 2009, the Cluster of environmental technology firms and the sustainable development has guaranteed a wide-reaching support of environmental technology firms regarding branches and investments in Luxembourg.
5. Individual communities and local authority associations organise regular information and awareness-raising campaigns on climate protection and thus also cover topics from the area of renewable energies and energy efficiency. The Luxembourg climate alliance communities play an important role in this work. *Myenergy* will in the coming years strive for increased cooperation with the local authorities in Luxembourg.

(d) Please indicate how information is made available on supporting measures for using renewable energy sources in electricity, heating and cooling and in transport to all relevant actors (consumers, builders, installers, architects, suppliers of relevant equipment and vehicles). Who is responsible for the adequacy and the publishing of this information? Are there specific information resources for the different target groups, such as end consumers, builders, property managers, property agents, installers, architects, farmers, suppliers of equipment using renewable energy sources, public administration? Are there information campaigns or permanent information centres in the present, or planned in the future?

myenergy provides interested actors information on promotion measures for the use of renewable energy sources in the areas of electricity, heating and cooling as well as, in the future, transport on its Internet site www.myenergy.lu, in its information brochures, through its Hotline, through thematic lectures, through its information stand at events, through “Infodays” as well as through individual advising discussions.

Private individuals and companies can find information and the corresponding application forms for the promotion measures for the use of renewable energy sources in the areas of electricity, heating and cooling at www.guichet.lu as well as transport.

Farmers can find a contact person in the area of promotion measures for the use of renewable energy sources in the agriculture administration (‘Administration des Services Techniques de l’Agriculture (ASTA)’).

The Chamber of Skilled Trades (‘Chambre des Metiers’) annually organises a further education course for tradespeople and installers where, upon successful completion, they receive a quality label in the areas of renewable energy and energy efficiency – the ‘Énergie fir d’Zukunft’ label. Within the framework of this course, the participants are also informed of the valid promotion measures for the use of renewable energy sources. General information on the label ‘Énergie fir d’Zukunft’ as well as on the current advanced training programme can be found at the website ‘Chambre des Metiers’ (www.cdmiau).

Since 2003, the professional association of architects and the consulting engineers (OAI) have organised a training cycle “Building and energy”. The training deals with topics from the planning phase to the technical equipment to the current promotion measures for the use of renewable energy sources and is primarily targeted at architects

and engineers.

The Ministry for Economic Affairs and Foreign Trade, the Ministry for Sustainable Development and Infrastructure as well as *myenergy* regularly organise information campaigns in the area of renewable energy sources.

With its “Infopoints”, *myenergy* provides, in the medium term, permanent regional information centres for the whole country.

- (e) **Who is responsible for publishing information on the net benefits, costs and energy efficiency of equipment and systems using renewable energy sources for heating, cooling and electricity? (Supplier of the equipment or system, public body or someone else?)**

It is currently being examined as to how the information on the net advantages, the costs and the energy efficiency of equipment and systems using renewable energy sources for heating, cooling and electricity can be best made available to the end user.

- (f) **How is guidance for planners and architects provided to help them to properly consider the optimal combination of renewable energy sources, high efficiency technologies and district heating and cooling when planning, designing, building and renovating industrial or residential areas? Who is responsible for that?**

Since 2003, the professional association of architects and the consulting engineers (OAI) have organised a training cycle “Building and energy”. The courses deal with topics on sustainable energy efficient building and are primarily targeted at architects and engineers. The training is centered on the end user and especially his feeling of well-being in his living and working areas as well as environmental protection when constructing or refurbishing buildings. All courses thus deals with topics from the planning phase to the technical equipment to the rain water management. Furthermore, information events on legal regulations and the basics of sustainable building are offered. The events usually include 3-hour lectures and offer time at the end for questions and an information exchange. The goal of the training cycle:

- ∩ information on legal regulations;
- ∩ in-depth knowledge in the area of sustainable construction;
- ∩ introduction of new methods and technologies.

With its basic advising, *myenergy* provides planning offices and architects the desired information so that they can optimally use renewable energy sources.

Furthermore the extent to which guides for the planning offices and architects can be useful is to be revised within the framework of the implementation of the directive.

The 'Règlement grand-ducal modifié du 30 novembre 2007 concernant la performance énergétique des bitiments d'habitation' stipulates that within the framework of larger building projects, a study on the supply technologies based on renewable energies.

- (g) Please describe the existing and planned information, awareness raising and training programmes for citizens on the benefits and practicalities of developing and using energy from renewable sources. What is the role of regional and local actors in the designing and managing these programmes?

The corresponding information has already been included in the answers under Point (c) of this chapter.

4.2.5 *Certification of installers (Article 14(3) of Directive 2009/28/EC)*

- (a) **Reference to existing national and/or regional legislation (if any) concerning certification or equivalent qualification schemes for installers according to Article 14(3) of Directive 2009/28/EC:**

Currently there is no legislation or alternative instruments which implement the certification systems or equivalent qualification systems in terms of Article 14(3). These should be prepared within the framework of the implementation of the directive.

- (b) **Responsible body/(ies) for setting up and authorising certification / qualification schemes by 2012 for installers of small-scale biomass boilers and stoves, solar photovoltaic and solar thermal systems, shallow geothermal systems and heat pumps:**

See answer under Point (a) of this chapter.

- (c) **Are such certification schemes / qualifications already in place? If so, please, describe.**

The Chamber of Skilled Trades ('Chambre des Metiers') annually organises a further education course for tradespeople and installers where, upon successful completion, they receive a quality label in the areas of renewable energy and energy efficiency – the 'Énergie fir d'Zukunft' label. At the same time, the 'Chambre des Metiers' publishes all graduates of this training on its Internet site www.cdm.lu.

At a national level, further advanced training opportunities will be offered which allow tradespeople and installer to attain qualifications both at the theoretic and at the practical level in the different technical areas of renewable energies.

- (d) Is information on these schemes publicly available? Are lists of certified or qualified installers published? If so, where? Are other schemes accepted as equivalent to the national/ regional scheme?**

General information on the label 'Énergie fir d'Zukunft' as well as the current training programme can be found on the Chamber of Skilled Trades Internet website at www.edm.lu. All people who have received the labels 'Énergie fir d'Zukunft' are listed here too.

- (e) Summary of existing and planned measures at regional / local levels (where relevant).**

Within the framework of Directive 2009/28/EC's implementation, a certification system for tradespeople will be implement which will take into account the circumstances in Luxembourg as well as already existing initiatives. In this context, appropriate training and advanced training programmes will be offered for tradespeople and the responsible authorities for the certification will be specified.

4.2.6. Electricity infrastructure development (Article 16(1) and Article 16(3) to (6) of Directive 2009/28/EC)

Besides the current situation and already existing legislation future actions, planned revisions, responsible bodies for it and expected results have to be described.

- (a) Reference to existing national legislation concerning requirements related to the energy grids (Article 16):**

The applicable national legislative is listed below:

'Loi modifide du 10 juin 1999 relative aux établissements classés';

'Règlement grand-ducal modifié du 16 juillet 1999 portant nomenclature et classification des établissements classés'

'Loi modal& du 1^{er} aotit 2007 relative à l'organisation du niarche de l'electricité' (in the following "electricity market law");

'Loi modifide du 1 wilt 2007 relative a l'organisation du marché du gaz nature]' (in the following "gas market law");

'Loi modifiée du 19 janvier 2004 - concernant la protection de la nature et des ressources naturelles; - modifiant la loi modifiée du 12 juin 1937 concernant l'aménagement des villes et autres agglomérations importantes; - completant la loi modifide du 31 mai 1999 portant institution d'un fonds pour la protection de l'environnement'.

- (b) How is it ensured that transmission and distribution grids will be developed with a view to integrating the targeted amount of renewable electricity while maintaining the secure operation of the electricity system? How is this requirement included in the transmission and distribution operators' periodical network planning?**

Within the framework of Article 9(2) of the electricity market law, system operators must guarantee a long-term adequate network capacity in order to be able to react to all reasonable enquiries from additional transmission capacities. Here, they must ensure that there are enough reserves available to guarantee a stable operation of the network.

The system operators are, according to Article 11 of the electricity market law, obligated to draw up a five-year plan for the network planning and investment plans. In terms of the monitoring of the supply availability, the ‘Commissaire du Gouvernement l’Énergie’ thereon publishes a report every two years on the findings and any measures taken or planned with regard to the development of network infrastructures.

(c) What will be the role of intelligent networks, information technology tools and storage facilities? How will their development be ensured?

The instruments mentioned will play an important but not primary role in the development of renewable energies. The first pilot projects on intelligent networks and meters have already been initiated by the system operator CREOS Luxembourg S.A. These pilot projects are to be evaluated in order to be able to, among other things, decide on the next steps for improved integration of renewable energy into the electricity networks. The economic evaluations planned for the introduction of intelligent measurement systems in the annex of Directive 2009/72/CE on joint regulations for the electrical domestic market will unveil further information on the introduction of intelligent meters in Luxembourg which should then make a coherent implementation in this area possible. Through the development of the pumped storage plant in Vianden from 1100 to approx. 1300 MW, additional capacities will be created to help smooth out the climatically-caused fluctuations of the electricity generated from renewable energies.

(d) Is the reinforcement of the interconnection capacity with neighbouring countries planned? If so, which interconnectors, for which capacity and by when?

Within the framework of the improvement of the national supply security as well as the increased integration of Luxembourg into the European electricity network, different approaches for the interconnections of Luxembourg with the transport networks of the neighbouring countries studied which could benefit development the renewable energies in the electricity network. This work will be pushed forward over the next few years. Against this backdrop, the project involving an additional connection with the French electricity grid is currently in the implementation phase.

(e) How is the acceleration of grid infrastructure authorisation procedures addressed? What is the current state and average time for getting approval? How will it be improved? (Please refer to current status and legislation, bottlenecks detected and plans to streamline procedure with timeframe of implementation and expected results.)

The current legal framework provides for authorisation at different levels:

1. Authorisation procedures in terms of the commodo-incommodo legislation of 10th July 1999. This procedure contains the areas environment and safety. Within this process, a public notice to the communities involved is planned

while the written objections of those involved can be presented.

2. Authorisation procedures in terms of the nature protection legislation of 19th January 2004. This law involves lines that pass through nature preserves. The procedure provides for a presentation of an environmental impact study by the applicant which represents the basis for the preparation of an authorisation by the Environmental Agency.
3. Authorisation procedures in terms of building authorisations are done at the local level.

The commodo-incommodo legislation provides the following authorisation categories in the « Règlement grand-ducal modifié du 16 juillet 1999 portant nomenclature et classification des établissements classés »:

Electricity transport and distribution	Masse
a) Industrial plants for transporting electrical energy over overhead lines	I
b) Overhead lines with nominal voltage which is greater than 1,000 V between the phases insofar as the project is not subject to a designated environmental impact assessment according to the legislation of 13 th March 2007 regarding <ol style="list-style-type: none"> 1. the implementation in Luxembourg law in the matter of transport infrastructure of the Directive 97/11/EC of the Council of 3rd March 1997 for the amendment of the Directive 85/337/EEG on environmental impact assessments with certain public and private projects 2. amendment of the law of 16th August 1967 on the creation of a large road network and a road fund as it was amended 3. amendment of the law 10th May 1995 on the administration of train infrastructure as it was amended. 	I
c) Construction of high power overhead lines for 220kV current or more and a length of more than 15 km	1

In the near future, within the framework of the measures for administrative streamlining, a series of authorisation procedures will be studied for their effectiveness.

Plans have been made to implement the necessary streamlining especially in the framework of the commodo-incommodo and the nature protection legislation.

The time period for the receipt of the required authorisations is usually between 1 and 5 years.

(f) How is coordination between grid infrastructure approval and other administrative planning procedures ensured?

The coordination of the planning and implementation of a new grid infrastructure, and/or the modernisation or modification of an existing infrastructure, is the responsibility of the system operators. Support can be requested, if needed, from the responsible authorities.

(g) Are priority connection rights or reserved connection capacities provided for new installations producing electricity from renewable energy sources?

Guaranteed network access in the public electricity grid is ensured according to Article 5(1) of the electricity market law which provides that the responsible system operator is obligated to connect every end consumer and every electricity producers on his electricity grid. According to Article 19(2), the connection must be done under objective and non-discriminatory condition.

(h) Are any renewable installations ready to come online but not connected due to capacity limitations of the grid? If so, what steps are taken to resolve this and by when is it expected to be solved?

No, according to the existing information, plants for the generation of energy from renewable sources can always be promptly connected to the grid.

(i) Are the rules on cost sharing and bearing of network technical adaptations set up and published by transmission and distribution system operators? If so, where? How is it ensured that these rules are based on objective, transparent and non-discriminatory criteria? Are there special rules for producers located in peripheral regions and regions with low population density? (*Cost bearing rules define which part of the costs is covered by the generator wishing to be connected and which part by the transmission or distribution system operator. Cost sharing rules define how the necessary cost should be distributed between subsequently connected producers that all benefit from the same reinforcements or new lines.*)

Based on Article 20 of the electricity market law, the regulating authorities ('Institut Luxembourgeois de Regulation (ILR)') das 'Règlement E09/03/ILR du 2 février 2009 fixant les méthodes de détermination des tarifs d'utilisation des réseaux de transport, de distribution et industriels et des services accessoires à l'utilisation des réseaux - Secteur Electricite' has decided which of the regulations with regard to costs for the grid use as well as the passing on of costs for technical adaptations of the grid apply. The costs are based on the principle of the 'Rate of Return Regulation' and the regulations for this are based on objective, transparent and non-discriminatory criteria. The ILR monitors the compliance and publishes these regulations on its website.

The ILR additionally regulates and monitors the costs for the connection to the electricity grid and is based on the provisions in Article 5(4) of the electricity market law. The publication of these financial conditions is ensured by system operators according to Article 60 of the electricity market law following successful authorisation by the ILR.

(j) Please describe how the costs of connection and technical adaptation are attributed to producers and/or transmission and/or distribution system operators? How are transmission and distribution system operators able to recover these investment costs? Is any modification of these costs bearing rules planned in the future? What changes do you envisage and what results are expected? *(There are several options for distributing grid connection costs. Member States are likely to choose one or a combination of these. According to the “deep” connection cost charging the developer of the installation generating electricity from renewable energy sources bears several grid infrastructure related costs (grid connection, grid reinforcement, and extension). Another approach is the “shallow” connection cost charging, meaning that the developer bears only the grid connection cost, but not the costs of reinforcement and extension (this is built into the grid tariffs and paid by the customers). A further variant is when all connection costs are socialized and covered by the grid tariffs.)*

In Luxembourg the concept of “deep connection cost charging” for the plants producing electricity from renewable energies is currently being used. The grid connection costs must be accepted by the regulatory authority (ILR). Each system operator determines the criteria for his grid connection costs. These criteria must, however, split the advantages of the network reinforcement and expansion between the end consumer, the producers and the system operators. This division must be based on objective, transparent and non-discriminatory criteria according to Article 5(4) of the electricity market law.

The system operators can generally get their investment expenditures back through the grid use charges provided for in the ‘Règlement E09/03/ILR du 2 février 2009 fixant les méthodes de détermination des tarifs d’utilisation des réseaux de transport, de distribution et industriels et des services accessoires A l’utilisation des réseaux Secteur Electricité’.

According to Article 5(6) of the electricity market law, the connection costs are to be borne by the electricity producer who has filed the application. If a reinforcement of the grid is required, these costs are usually borne by the electricity producer who filed the application taking into consideration the above-mentioned division of advantages between producers, end consumers and system operators. The electricity market law provides, however, using a Grand Ducal decree, for the refund of a part of these connection and reinforcement costs to the producers which arise when connecting new production plants.

Within the framework of Directive 2009/28/EC's implementation, it is to be revised as to whether an adaptation of the current, valid regulations is necessary.

- (k) **Are there rules for sharing the costs between initially and subsequently connected producers? If not, how are the benefits for subsequently connected producers taken into account?**

Currently there are no rules in this area. This aspect should be studied more closely within the framework of the implementation of the directive.

- (l) **How will it be ensured that transmission and distribution system operators provide new producers wishing to be connected with the necessary information on costs, a precise timetable for processing their requests and an indicative timetable for their grid connection??**

The connection costs and the requirements are, according to Article 5(4)(5) of the electricity market law, approved by the regulatory authority (ILR) and published by the grid operators according to Article 60. The system operators must, according to Article 19 of the electricity market law, if additional reinforcement measures are necessary, notify the applicant as well as the ILR within 30 days regarding the measures which have to be taken in order to meet the additional demand.

4.2.7. Electricity network operation (Article 16(2) and Article 16(7) and (8) of Directive 2009/28/EC)

- (a) **How is the transmission and distribution of electricity from renewable energy sources guaranteed by transmission and distribution system operators? Is priority or guaranteed access ensured??**

A general statement on this point can be found under Point 4.2.6. (g).

According to Article 5(6) and 7 of the 'Règlement grand-ducal du 8 février 2008 relatif à la production d'électricité basée sur les sources d'énergie renouvelables', the operators of plants which generate electricity from renewable energies are not charged for the use of the grid. This regulation applies to producers who have been processed within the 'mécanisme de compensation'. All other plants are not covered by this regulation.

Access to the public electricity grid is ensured according to Article 5(1) of the electricity market law.

- (b) **How is it ensured that transmission system operators, when dispatching electricity generating installations give priority to those using renewable energy sources?**

According to Article 27(10) of the electricity market law, transmission system operators are required to give priority to the electricity generating installations which among other sources are using renewable energy sources when claiming capacities.

- (c) **How are grid and market-related operational measures taken in order to minimise the curtailment of electricity from renewable energy sources? What kinds of measures are planned and when is implementation expected? (*Market and grid*)**

design that enable the integration of variable resources could cover measures such as trading closer to real time (changing from day-ahead to intra-day forecasting and rescheduling of generators), aggregation of market areas, ensuring sufficient cross border interconnection capacity and trade, improved cooperation of adjacent system operators, the use of improved communication and control tools, demand-side management and active demand-side participation in markets (through two-way communication systems - smart metering), increased distributed production and domestic storage (e.g. electric cars) with active management of distribution networks (smart grids).

Currently there are not regulations which prevent the curtailment of the feeding in of electricity from renewable energy sources.

Within the framework of the implementation of Directive 2009/28/EC the extent to which it is advisable to propose the above-mentioned measures in the national legislation should be studied.

(d) Is the energy regulatory authority informed about these measures? Does it have the competence to monitor and enforce implementation of these measures?

The regulatory authority (ILR) has the competences both with regard to the activities in the electricity market area and at the network level. It is also responsible for the relevant questions on grid access and must provide for a transparent and non-discriminatory network access.

(e) Are plants generating electricity from renewable energy sources integrated in the electricity market? Could you please describe how? What are their obligations regarding participation in the electricity market?

The promotion of electricity from renewable energy sources is ensured through a feed-in-tariff. The electricity generated is fed into the public grid and accepted by system operators and remunerated and then resold by these operators.

Systems which do not participate in the feed-in tariff, can offer their electricity directly on the electricity market and also apply for electronic certificates of origin according to the EEC standard and sell.

(f) What are the rules for charging transmission and distribution tariffs to generators of electricity from renewable energy sources?

According to Article 5(6 and 7) of the 'Règlement grand-ducal du 8 février 2008 relatif à la production d'électricité basée sur les sources d'énergie renouvelables', the use of the grid for the system operators from renewable energies is free provided that the system is entitled to a feed-in tariff.

4.2.8 Biogas integration into the natural gas network (Article 16(7) and Article 16(9) and (10) of Directive 2009/28/EC)

- (a) How is it ensured that the charging of transmission and distribution tariffs does not discriminate against gas from renewable energy sources?**

The gas market law stipulates in Article 11(2) e) a general obligation for the acquisition of biogases fed-in to the natural gas grid.

In the 'Règlement E09/04/ILR du 2 février 2009 fixant les méthodes de détermination des tarifs d'utilisation des réseaux de transport, de distribution et des services accessoires à l'utilisation des réseaux - Secteur Gaz naturel' the regulations with regard to the costs for the grid use as well as the forwarding of the costs for technical adaptations of the grid are specified. The costs are based on the principle "Rate of Return Regulation" and the regulations for this are based on objective, transparent and non-discriminatory criteria. The regulatory authority ILR monitors compliance of the latter.

Furthermore the ILR regulates and monitors the costs for connections, grid use and technical adaptations in the gas grid. The ILR is based here on the regulations which implement the gas market law.

The same transmission and distribution tariffs apply for all types of gas which can be fed into the grid.

- (b) Has any assessment been carried out on the need to extend the gas network infrastructure to facilitate the integration of gas from renewable sources? What is the result? If not, will there be such an assessment?**

The preparation of an analysis of the gas grid infrastructure should be studied.

Furthermore, the gas market law establishes a general obligation of the natural gas grid operator to analyse the viability of the connection of a biogas producer to the natural gas grid in Article 9.

- (c) Are technical rules on network connection and connection tariffs for biogas published? Where are these rules published?**

The rules and tariffs are regulated through regulations which implement, the gas market law.

In 'Règlement E09/04/ILR du 2 février 2009 fixant les méthodes de détermination des tarifs d'utilisation des réseaux de transport, de distribution et des services accessoires à l'utilisation des réseaux Secteur Gaz naturel' the regulations with regard to the costs for grid use as well as the forwarding of the costs for technical adaptations of the grid are specified. The costs are based on the principal "Rate of Return Regulation" and the regulations for this are based on objective, transparent and non-discriminatory criteria. The regulatory authority ILR monitors compliance of the latter.

Furthermore the ILR regulates and monitors the costs for connections, grid use and technical adaptations in the gas grid. The ILR is based here on the regulations which implement the gas market law.

4.2.9. District heating and cooling infrastructure development (Article 16(11) of Directive 2009/28/EC)

- (a) Please provide an assessment of the need for new district heating and cooling infrastructure using renewable energy sources and contributing to the 2020 target. Based on this assessment, are there plans to promote such infrastructures in the future? What are the expected contributions of large biomass, solar and geothermal facilities in the district heating and cooling systems?

In order to be able to meet the target given in the Directive 2009/28/EC, electricity and heat generation (CHP operation) in biogas plants, in biomass heating plants and in waste incinerating plants as well as the heat generation in the biomass heating plants must be significantly increased. This also makes the development of a district heating infrastructure²⁷ necessary in many cases. In individual cases a district cooling infrastructure is also expected here.

Currently there is a heating infrastructure only in individual areas of Luxembourg. Within the framework of the CHP potential study for Luxembourg areas suitable for district heating have been obtained in detail. The potentials determined for an economical district heating development amount to approx. 1051 GWh, of which 277 GWh was already in 2006 covered by through CHP heating with conventional energy sources. A portion of this could also be supplied through renewable energies. According to the forecasts within the framework of the preparation of the existing Action Plan, around 554 GWh could be generated from district heating from renewable energies in 2020.

The development of district heating is promoted using investment incentives for local authorities and companies as well as a heating bonus coupled with the feed-in tariff for renewable electricity.

4.2.10. Biofuels and other bioliquids – sustainability criteria and verification of compliance (Articles 17 to 21 of Directive 2009/28/EC)

The following part of the national action plan should explain Member States' future strategy regarding fulfilment of the sustainability criteria for biofuels and bioliquids and verification of compliance with the scheme.

- (a) **How will the sustainability criteria for biofuels and bioliquids be implemented at national level? (Is there legislation planned for implementation? What will be the institutional setup?)**

The type of implementation of the sustainability criteria in the Luxembourg law is currently being examined. At present it is considered to implement the sustainability criteria with a law or a decree in which the institutional responsibility is also regulated. With the implementation, emphasis will be put on the compatibility of the future Luxembourg regulation with the regulations of other countries.

District heating is understood as grid-couple heating within the framework of the existing plans.

- (b) **How will it be ensured that biofuels and bioliquids that are counted towards the national renewable target, towards national renewable energy obligations and/or are eligible for financial support comply with the sustainability criteria set down in Article 17(2) to (5) of Directive 2009/28/EC? (Will there be a national institution / body responsible for monitoring / verifying compliance with the criteria?)**

The type of implementation of the sustainability criteria in the Luxembourg law is currently being examined. At present it is considered to regulate the revision of the sustainability criteria with a law or a decree. With the implementation, emphasis will be put on the compatibility of the future Luxembourg regulation with the regulations of other countries.

- (c) **If a national authority / body will monitor the fulfilment of the criteria, does such a national authority / body already exist? If so, please specify. If not, when is it envisaged to be established?**

The type of implementation of the sustainability criteria in the Luxembourg law is currently being examined. At present it is being considered to regulate the question on the authority for the examination of the sustainability criteria with a regulation or decree. With the implementation, emphasis will be put on the compatibility of the future Luxembourg regulation with the regulations of other countries.

- (d) **Please provide information on the existence of national law on land zoning and national land register for verifying compliance with Article 17(3) to (5) of Directive 2009/28/EC. How economic operators can access to this information? (Please provide information on the existence of rules and distinction between different land statuses, like biodiversity area, protected area etc; and on the competent national authority who will monitor this land register and changes in land status.)**

The type of implementation is currently being examined. It can be assumed that these aspects of the directive will be implemented using a regulation or decree.

For agricultural land there is a geographical data base where the agricultural administration ('Administration des Services Techniques de l'Agriculture (ASTA)') which keeps records of the respective use of the land (grassland maize production, wheat crops, rape crops...). This information further serves to control the areas under cultivation by the agricultural board of control (UNICO) of the Ministry of Agriculture, Viticulture and Rural Development ('Ministère de l'Agriculture, de la Viticulture et du Développement rural').

For forest land, there is a geographical data base where the nature administration is recorded ('Administration de la nature et des forêts'). This information furthermore serves to control the land.

The Ministry for Sustainable Development and Infrastructure administers a geographical data base with all land use for all of Luxembourg.

- (e) **As far as protected areas are concerned, please provide information under which national, European or international protection regime they are classified..**

European protective regulations:

- Directive 79/409/EEG of the Council of 2nd April 1979 on compliance of the conservation of wild birds;
- Directive 92/43/EEG of the Council of 21st May 1992 on the conservation of natural habitats as well as wild flora and fauna;
- European Landscape Convention of 20th October 2000 in Florence;
- Directive 2000/60/EC of the European Parliament and of the Council of 23rd October 2000 for the creation of a regulatory framework for measures of the community in the area of water policies.
- National protective regulations:
 - 'Loi modifiée du 19 janvier 2004 concernant la protection de la nature et des ressources naturelles';
 - 'Loi du 4 mars 1994 portant approbation de la Convention sur la diversité biologique faite à Rio de Janeiro, le 5 juin 1992';
 - 'Loi du 24 juillet 2006 portant approbation de la Convention européenne du paysage ouverte à la signature, à Florence, le 20 octobre 2000';
 - 'Loi du 19 décembre 2008 relative à l'eau';
 - 'Plan National pour un Développement Durable' from 1999;
 - 'Plan National pour la Protection de la Nature' from 2007 .

- (f) **What is the procedure for changing the status of land? Who monitors and reports at national level on land status changes? How often are the land zoning register updated (monthly, annually, bi-annually, etc.)?**

The farmers annually submit their management plan for the coming year to ASTA and the agricultural economic service ('Service d'Economie Rurale (SER)'). In this plan, the planned use of each agricultural parcel is listed. This data is recorded into the geographic data base and used accordingly for preparing national statistics. The UNICO checks the information of the farmers using a 5 % land-related random sampling. Every three years, the aerial photos are taken which the geographic data base refers to. A new layer of reference parcels is created and evaluated by the farmers.

The nature administration updates its data base regularly and the collected data is used for preparing national statistics.

- (g) **How is compliance with good agro-environmental practices and other cross compliance requirements (required by Article 17(6) of Directive 2009/28/EC) ensured and verified at national level?**

The UNICO of the Ministry for Agriculture, Viticulture and Rural Development regularly monitors and checks the preservation of the good agricultural and ecological conditions using a land-related random sampling. The basis for this control is the 'Cross Compliance' which unites all people in the agriculturally relevant sustainability criteria.

- (h) **Do you intend to help develop voluntary "certification" scheme(s) for biofuel and bioliquid sustainability as described in the second subparagraph of Article 18(4) of Directive 2009/28/EC? If so, how?**

Currently there is no contact with other Member States and institutes to

check to what extent such voluntary “certification regulations” can be implemented.

4.3. Support schemes to promote the use of energy from renewable resources in electricity applied by the Member State or a group of Member States

Support schemes can be regulatory, providing for targets and/ or obligations. They may provide financial support either for investment or during the operation of a plant. There are also soft measures like information, education, or awareness raising campaigns. As soft measures are described above, this assessment should focus on regulatory and financial measures.

Please describe existing schemes with legal reference, details of the scheme, duration (indicating start and end dates), past impact and explain whether any reform or future schemes are planned and by when. What are the expected results?

Financial support

Financial support can be classified in various ways. Examples are: financial support for investment, capital grants, low interest loans, tax exemptions or reductions, tax refunds, tender schemes, renewable energy obligations with or without green certificates (tradable green certificates), feed-in tariffs, feed-in premiums, voluntary schemes

For any scheme you use, please give a detailed description answering the following questions?

Investment assistance for private individuals

(a) What is the name and a short description of the scheme?

Investment support is granted within the framework of a five-year promotion programme (‘Règlement grand-ducal du 20 avril 2009 instituant un régime d’aides pour la promotion de l’utilisation rationnelle de l’énergie et la mise en valeur des énergies renouvelables’). The corresponding investment must be done between 1st January 2008 and 1st December 2012. The promotion application must be submitted to the Environmental Administration using an application form. The statute of limitations for the promotion application is 2 years beginning from 31st December of the calendar year in which the investment was effected.

Private individuals can apply for investment incentives in the area of electricity generation from renewable energy sources for the following technologies: Photovoltaics, micro CHP.

(b) Is it a voluntary or obligatory scheme?

This is a voluntary measure.

(c) Who manages the scheme? (Implementing body, monitoring authority)

The measure is administered by the Ministry for Sustainable Development

and Infrastructure and the Environmental Administration.

(d) What are the measures taken to ensure availability of necessary budget/funding?

The means are established using the annual budget law.

(e) How is long-term security and reliability addressed by the scheme?

The time period of the promotion programme is 5 years. The investment incentives for private individuals are adjusted to the targets within the framework of the implementation of this plan if this is deemed necessary.

(f) Is the scheme periodically revised? What kind of feed-back or adjustment mechanism exists? How has the scheme been optimised so far?

The Environmental Administration regularly keeps statistics on the number of supported projects. The promotion programme has existed since 2001 and has already been adjusted several times when needed.

(g) Does support differ according to technology?

The support is specific to the technology. Detail can be found in the following table:

PHOTOVOLTAIC

Assistance (%)	Maximum (€/kW_p)	Conditions
30	1650	Installation on roof, facade or integrated into the building shell, Maximum subsidisable peak performance: 30 kW _p per location

The promotion refers to material costs (photovoltaic modules, installation system, electrical cable, inverter, electrical protective equipment and feed-in meter) and installation costs.

MICRO CHP

Combustion motor, Stirling motor, fuel cells

Assistance (%)	Maximum (€)	Conditions
25	3000	Fuel or heating source from renewable energies (except for the fuel cell), annual use efficiency • 85%, annual operating hours • 5000 hours, Dimensioning according to VDI 3985 and VDI 2067-sheet 7; base load not larger than 30% of the maximum thermal building load, Joint use of heating and electricity, Use of an emergency cooler not allowed.

(h) What are the expected impacts in terms of energy production?

An increase in renewable energy production is desired.

(i) Is support conditional on meeting energy efficiency criteria?

The above-mentioned conditions including efficiency criteria, must be complied with in the installation of the system in order to be able to receive support.

(j) Is it an existing measure? Could you please indicate national legislation regulating it?

The conditions listed above, also including efficiency criteria, must be complied with during the installation of the system in order to be able to receive support.

The measures were introduced in 2001 through a regulation and last updated in 2009. The current legislation is the 'Règlement grand-ducal du 20 avril 2009 instituant un régime d'aides pour la promotion de l'utilisation rationnelle de l'énergie et la mise en valeur des énergies renouvelables'.

(k) Is this a planned scheme? When would it be operational?

There are existing measures.

(l) What start and end dates (duration) are set for the whole scheme?

In order to be able to take part in the scheme, an investment in this regard must be effected between 1st January 2008 and 31st December 2012.

(m) Are there maximum or minimum sizes of system which are eligible?

For photovoltaic there is a maximum subsidisable peak performance of 30 kW_p per location.

For a micro CHP, there must be an electric nominal capacity between 1 and 6 kW in order to be eligible for financial assistance.

- (m) **Is it possible for the same project to be supported by more than one support measure? Which measures can be cumulated?**

A project which uses one of the mentioned investment incentives can also take advantage of the feed-in tariffs for electricity from renewable energy sources based on the 'Règlement grand-ducal du 8 février 2008 relatif à la production d'électricité basée sur les sources d'énergie renouvelables'.

- (n) **Are there regional / local schemes? If so, please detail using the same criteria.**

Diverse communities have their own promotion schemes for private individuals.

Specific questions for financial support for investment:

- (a) **What is granted by the scheme? (subsidies, capital grants, low interest loans, tax exemption or reduction, tax refunds)**

The measures grant investment incentives.

- (b) **Who can benefit from this scheme? Is it specified for certain technology(/ies)?**

Private individuals can profit from the measures. In the area of electricity from renewable energy sources, the measures apply to photovoltaics and micro CHPs.

- (c) **Are applications continuously received and granted or are there periodical calls? If periodical, could you please describe the frequency and conditions?**

Applications are accepted continuously.

Investment assistance for companies (1)

- (a) **What is the name and a short description of the scheme?**

Investment assistance for companies is granted within the framework of the 'Régimes d'aides à la protection de l'environnement et à ('utilisation rationnelle des ressources naturelles'. The amount of assistance is specified in the 'Loi du 18 février 2010 relative à un régime d'aides à la protection de l'environnement et à l'utilisation rationnelle des ressources naturelles'. The applications must be submitted before effecting the investments or the expenditures involved to the Ministry of Economic Affairs and Foreign Trade.

- (b) **Is it a voluntary or obligatory scheme?**

This is a voluntary scheme.

- (c) **Who manages the scheme? (*Implementing body, monitoring authority*)**

The measure is managed by the Ministry for Economic Affairs and Foreign Trade together with an expert commission set up for this purpose.

- (d) **What are the measures taken to ensure availability of necessary budget/funding to achieve the national target?**
The funding is specified using annual budget law.
- (e) **How is long-term security and reliability addressed by the scheme?**
The promotion programme is regularly checked by the expert commission set up for this purpose.
- (f) **Is the scheme periodically revised? What kind of feed-back or adjustment mechanism exists? How has the scheme been optimised so far?**
The promotion programme exists since 2004 and was last updated in 2010.
- (g) **Does support differ according to technology?**
The amount of support is determined specific to technology and project taking the EU assistance framework of the expert commission into account. Detailed guidelines have been worked out.
- (h) **What are the expected impacts in terms of energy production?**
An increase in the renewable generation of electricity is desired.
- (i) **Is support conditional on meeting energy efficiency criteria?**
Energy efficiency criteria are contained in the guidelines.
- (j) **Is it an existing measure? Could you please indicate national legislation regulating it?**
The measures were introduced in 2004 and amended through the 'Loi du 18 février 2010 relative à un régime d'aides à la protection de l'environnement et A l'utilisation rationnelle des ressources naturelles'.
- (k) **Is this a planned scheme? When would it be operational?**
This is an existing scheme
- (l) **What start and end dates (duration) are set for the whole scheme?**
The scheme will apply until 31st December 2013.
- (m) **Are there maximum or minimum sizes of system which are eligible?**
There is no maximum or minimum system size planned within the framework of these measures.
- (n) **Is it possible for the same project to be supported by more than one support measure? Which measures can be cumulated?**
A subsidisable project here can also take advantage of the feed-in tariff for electricity from renewable energy sources, based on the 'Règlement grand-ducal du 8 février 2008 relatif à la production d'électricité basée sur les sources d'énergie renouvelables'.
- (o) **Are there regional / local schemes? If so, please detail using the same criteria.**

There are no local measures within this framework.

Specific questions for financial support for investment:

- (a) **(What is granted by the scheme? (subsidies, capital grants, low interest loans, tax exemption or reduction, tax refunds)**

The measures offer investment incentives.

- (b) **Who can benefit from this scheme? Is it specified for certain technology(/ies)?**

Companies can benefit from the measures. The measures apply to all technologies in the area of energy production based on renewable energy sources.

- (c) **Are applications continuously received and granted or are there periodical calls? If periodical, could you please describe the frequency and conditions?**

Applications are accepted continuously.

Investment assistance for companies (2)

- (a) **What is the name and a short description of the scheme?**

Investment assistance for small and medium-sized companies is granted within the framework the 'Régimes d'aides en faveur du secteur des classés moyennes'. The amount of the assistance is specified in 'Loi du 30 juin 2004 portant creation d'un cadre général des régimes d'aides en faveur du secteur des classés moyennes'. The application must be submitted to the Ministry for Middle Classés and Tourism before the start of the work.

- (b) **Is it a voluntary or obligatory scheme?**

This is a voluntary scheme.

- (c) **Who manages the scheme? (Implementing body, monitoring authority)**

The measure is managed by the Ministry for Middle Class and Tourism together with an expert commission set up for this purpose.

- (d) **What are the measures taken to ensure availability of necessary budget/funding to achieve the national target?**

The funding is determined using the annual budget law.

- (e) **How is long-term security and reliability addressed by the scheme?**

The support programme is regularly checked by the expert commission set up for this purpose.

- (f) **Is the scheme periodically revised? What kind of feed-back or adjustment mechanism exists? How has the scheme been optimised so far?**

The support programme is regularly checked by the expert commission set up for this purpose.

(f) Does support differ according to technology?

The amount of the support is determined specific to the technology and project taking the EU assistance framework of the expert commission into account.

(h) What are the expected impacts in terms of energy production?

An increase in renewable generation of electricity is desired.

(i) Is support conditional on meeting energy efficiency criteria?

Energy efficiency criteria can be considered by the expert commission.

(j) Is it an existing measure? Could you please indicate national legislation regulating it.

The measure was introduced in 2004 through the 'Loi du 30 juin 2004 portant creation d'un cadre général des régimes d'aides en faveur du secteur des classés moyennes' and implemented through the 'Règlement grand-ducal du 24 novembre 2005 portant execution de Particle 4 de la loi du 30 juin 2004 portant creation d'un cadre général des régimes d'aides en faveur du secteur des classés moyennes et instituant un régime d'aides en vue d'encourager et de soutenir les entreprises luxembourgeoises en matiere de protection de l'environnement et d'utilisation rationnel le des ressources naturelles'.

(k) Is this a planned scheme? When would it be operational?

This is an existing measure.

(l) What start and end dates (duration) are set for the whole scheme?

The scheme applies since its introduction in June 2004.

(m) Are there maximum or minimum sizes of system which are eligible?

There is no maximum or minimum planned within the framework of these measures.

(n) Is it possible for the same project to be supported by more than one support measure? Which measures can be cumulated?

A project which receives financial assistance here can also take advantage of the feed-in tariff for electricity from renewable energy sources, based on the 'Règlement grand-ducal du 8 février 2008 relatif à la production d'electricite basic sur les sources d'energie renouvelables'.

(o) Are there regional / local schemes? If so, please detail using the same criteria.

There are no local measures within this framework.

Specific questions on financial support for investments:

(a) What is granted by the scheme? (subsidies, capital grants, low interest loans, tax exemption or reduction, tax refunds)

The measures offer investment incentives.

(b) Who can benefit from this scheme? Is it specified for certain technology(/ies)?

Small and medium-sized companies can benefit from the scheme. The

measures apply to all technologies in the area of renewable energy sources.

- (c) **Are applications continuously received and granted or are there periodical calls? If periodical, could you please describe the frequency and conditions?**

Applications are accepted continuously.

Investment assistance for communities

- (a) **What is the name and a short description of the scheme?**

Investment assistance is granted within the framework of the 'Loi du 31 mai 1999 portant institution d'un fonds pour la protection de l'environnement'. The amount of the assistance is specified in a circular (Circulaire n° 2489 du 20 avril 2005). The application must be submitted to the Ministry for Sustainable Development and infrastructure before the start of the work. This is evaluated following completion by a committee.

Communities can apply for investment incentives in the area of electricity generation from renewable energy sources for the following technologies: photovoltaics, bioenergy.

- (b) **Is it a voluntary or obligatory scheme?**

This is a voluntary scheme..

- (c) **Who manages the scheme? (*Implementing body, monitoring authority*)**

The measure is managed by the Ministry for Sustainable Development and Infrastructure together with a committee, the 'Comite de gestion du fonds pour la protection de l'environnement'.

- (d) **What are the measures taken to ensure availability of necessary budget/funding to achieve the national target?**

The availability of adequate funding is ensured through the 'Fonds pour la protection de l'environnement ».

- (e) **How is long-term security and reliability addressed by the scheme?**

The promotion programme is checked regularly by the committee set up for this purpose.

- (f) **Is the scheme periodically revised? What kind of feed-back or adjustment mechanism exists? How has the scheme been optimised so far?**

The promotion programme is checked regularly by the committee set up for this purpose. The criteria for the issuing of funding should be amended within the framework of the implementation of this plan.

- (g) **Does support differ according to technology?**

The support is technology-specific:

BIOENERGY

An energy centre for electricity and heat generation using biomass is supported with a financial assistance of 33% of the investment costs.

PHOTOVOLTAIC

A photovoltaic system is supported with financial assistance of 15% of the investment costs and is limited to a maximum of 900 €/kWp. The system must be installed in/on a building shell.

(h) What are the expected impacts in terms of energy production?

An increase in renewable generation of electricity is desired.

(i) Is support conditional on meeting energy efficiency criteria?

Energy efficiency criteria have been taken into account by the committee.

(j) Is it an existing measure? Could you please indicate national legislation regulating it?

The measures were introduced in 2005 in the 'Circulaire n° 2489 du 20 avril 2005' based on the 'Loi du 31 mai 1999 portant institution d'un fonds pour la protection de l'environnement'.

(k) Is this a planned scheme? When would it be operational?

This is an existing scheme.

(l) What start and end dates (duration) are set for the whole scheme?

The measures have been in effect since 1st January 2005.

(m) Are there maximum or minimum sizes of system which are eligible?

Within the framework of these measures, there is no maximum or minimum system size planned.

(n) Is it possible for the same project to be supported by more than one support measure? Which measures can be cumulated?

Such a project which is promoted here can also take advantage of the feed-in tariff for electricity from renewable energy sources, based on the 'Règlement grand-ducal du 8 février 2008 relatif à la production d'électricité basée sur les sources d'énergie renouvelables'.

(o) Are there regional / local schemes? If so, please detail using the same criteria.

There are no local measures within this framework.

Specific questions for the financial support for investments:

(a) What is granted by the scheme? (subsidies, capital grants, low interest loans, tax exemption or reduction, tax refunds)

The measures offer investment incentives.

(b) Who can benefit from this scheme? Is it specified for certain technology(/ies)?

Communities and community syndicates can benefit from the measures. In the area of electricity from renewable energy sources, the measures apply to photovoltaics as well as energy centrals for electricity and heat generation from biomass.

- (c) **Are applications continuously received and granted or are there periodical calls? If periodical, could you please describe the frequency and conditions?**

Applications are accepted continuously.

Investment assistance for agricultural operations

- (a) **What is the name and a short description of the scheme?**

Investment assistance for agricultural operations is granted within the framework of the 'Soutien an développement rural'. The amount of the assistance is specified in the 'Loi du 18 avril 2008 concernant le renouvellement du soutien au ddveloppement rural'.

- (b) **Is it a voluntary or obligatory scheme?**

This is a voluntary measure.

- (c) **Who manages the scheme? (Implementing body, monitoring authority)**

The scheme is managed by the Ministry of Agriculture, Viticulture and Rural Development together with an expert commission set up for this scheme, the 'Commission économique et technique'.

- (d) **What are the measures taken to ensure availability of necessary budget/funding?**

The availability of adequate funding is ensured using the 'Fonds d'orientation dconomique et social pour l'agriculture'..

- (e) **How is long-term security and reliability addressed by the scheme?**

The promotion programme is regularly checked by the expert commission set up for this purpose.

- (f) **Is the scheme periodically revised? What kind of feed-back or adjustment mechanism exists? How has the scheme been optimised so far?**

The promotion programme has been in existence since 2001 and was last updated in 2009.

- (g) **Does the support differ depending on the technology?**

The support applies for the investments in the following technologies in the area of the generation of electricity based on renewable energy sources:

- Biogas plants where the electricity is produced by a CHP
- Biogas plants which process biogas to natural gas quality and feed it into the natural gas grid.

- (h) **What are the expected impacts in terms of energy production?**

An increase in the renewable generation of electricity is desired.

(i) Is support conditional on meeting energy efficiency criteria?

Yes, systems which produce (renewable) electricity using combined heat and power must further use 50% of the produced and not self-used heating in order to benefit from the support. Additionally, self-ignition motors may not be operated with fossil fuels in order to be subsidisable.

(j) Is it an existing measure? Could you please indicate national legislation regulating it?

This is an existing measure. The measure applies since 1st January 2007.

(k) Is this a planned scheme? When would it be operational?

This is an existing measure.

(l) What start and end dates (duration) are set for the whole scheme?

The measure applies since 1st January 2007 for a duration of 7 years.

(m) Are there maximum or minimum sizes of system which are eligible?

There is no maximum or minimum system size planned within the framework of this measure.

(n) Is it possible for the same project to be supported by more than one support measure? Which measures can be cumulated?

A project supported here can also benefit from the feed-in tariff for electricity from renewable energy sources based on the 'Règlement grand-ducal du 8 février 2008 relatif à la production d'électricité basée sur les sources d'énergie renouvelables'.

(p) (o) Are there regional / local schemes? If so, please detail using the same criteria.

There are no local measures within this framework.

Specific questions for financial support for investment:

(a) What is granted by the scheme? (subsidies, capital grants, low interest loans, tax exemption or reduction, tax refunds)

The measures offer investment incentives.

(b) Who can benefit from this scheme? Is it specified for certain technology (/ies)?

Agricultural operations can benefit from the measures. The measures apply to the investments in the following technologies in the area of the generation of electricity based on renewable energy sources:

- Biogas plants where the electricity is produced based on combined heat and power
- Biogas plants which process biogas to natural gas quality and feed it into the natural gas grid.

(c) Are applications continuously received and granted or are there

periodical calls? If periodical, could you please describe the frequency and conditions?

Applications are accepted continuously.

Feed-in tariff for electricity from renewable energy sources

(a) What is the name and a short description of the scheme?

Acceptance of renewable electricity into the electricity grid is ensured at an established tariff according to the 'Règlement grand-ducal du 8 février 2008 relatif à la production d'électricité basée sur les sources d'énergie renouvelables'. Additionally the owner of the electricity generation plant must conclude a contract authorised by the Institut Luxembourgeois de Régulation with a system operator.

The electricity feed-in tariff applies to the following technologies:

- Photovoltaic
- Biogas
- Sewage gas
- Solid biomass
- Old and scrap wood
- Wind energy
- Hydro energy

(b) Is it a voluntary or obligatory scheme?

This is a voluntary measure.

(c) Who manages the scheme? (Implementing body, monitoring authority)

The measure is subject to the responsibility of the Ministry of Economic Affairs and Foreign Trade.

(d) What are the measures taken to ensure availability of necessary budget/funding?

The availability of adequate funding is ensured by the compensation mechanism of the 'Mécanisme de compensation'.

(e) How is long-term security and reliability addressed by the scheme?

The measure provides for a 15-year feed-in tariff, as well as no limitations on the term. The amount and structure of the feed-in tariff is to be adjusted within the framework of the implementation of this plan when needed.

(f) Is the scheme periodically revised? What kind of feed-back or adjustment mechanism exists? How has the scheme been optimised so far?

The measure is regularly checked by the Ministry of Economic Affairs and Foreign Trade. The feed-in tariff was last adjusted in 2008.

(g) **Does support differ according to technology?**

The support is specific to the technology:

PHOTOVOLTAIC

Performance class	Tariff
Electrical peak performance • 30 kW _p 30	420 x (1-(n-2008) x 3.00/100) €/MWh
30 kW _p < electrical peak performance • 1 MW _p	370 x (1-(n-2008) x 3.00/100) €/MWh

n: Year of the first electricity feed-in

The system must be installed in/on a building shell.

BIOGAS

Performance class	Tariff
Electrical nominal capacity < 150 kW	150 x (1-(n-2008) x 0.25/100) €/MWh
150 kW < electrical nominal capacity • 300 kW	140 x (1-(n-2008) x 0.25/100) €/MWh
300 kW < electrical nominal capacity • 500 kW	130 x (1-(n-2008) x 0.25/100) €/MWh
500 kW < electrical nominal capacity • 2500 kW	120 x (1-(n-2008) x 0.25/100) €/MWh

n: Year of the first electricity feed-in

An additional heating bonus of 30€ a month for commercialised heating will be paid which is produced exclusively based on biogas, if the following conditions are met:

- During the first three years after commissioning of the biogas plant, the commercialised heating must represent at least 25% of the total heating generated.
- Beginning with the fourth year after commissioning of the biogas plant, the commercialised heating must represent at least 50% of the total heating produced.

SEWAGE GAS

Tariff
$65 \times (1-(n-2008)) \times 0.25/100$ €/MWh

n: Year of the first electricity feed-in SOLID

BIOMASS

Performance class	Tariff
Electrical nominal capacity • 1 MW	$145 \times (1-(n-2008)) \times 0.25/100$ €/MWh
1 MW < electrical nominal capacity • 5 MW	$125 \times (1-(n-2008)) \times 0.25/100$ €/MWh

n: Year of the first electricity feed-in

An additional heating bonus of 30€ a month of commercialised heating will be paid if the following conditions are met:

- During the first three years after commissioning of the biogas plant, the commercialised heating must represent at least 35% of the total heating generated.
- Beginning with the fourth year after commissioning of the biogas plant, the commercialised heating must represent at least 75% of the total heating produced.

OLD AND SCRAP WOOD

Performance class	Tariff
Electrical nominal capacity • 1 MW	$130 \times (1-(n-2008)) \times 0.25/100$ €/MWh
1 MW < electrical nominal capacity • 5 MW	$110 \times (1-(n-2008)) \times 0.25/100$ €/MWh

n: Year of the first electricity feed-in

An additional heating bonus of 30€ a month of commercialised heating will be paid if the following conditions are met:

- During the first three years after commissioning of the biogas plant, the commercialised heating must represent at least 35% of the total heating generated.
- Beginning with the fourth year after commissioning of the biogas plant, the commercialised heating must represent at least 75% of the total heating produced.

WIND ENERGY

Tariff
$82.70 \times (1 - (n - 2008) \times 0.25/100)$ E/MWh

n: Year of the first electricity feed-in

HYDRO ENERGY

Performance class	Tariff
electrical nominal capacity • 1 MW	$105 \times (1 - (n - 2008) \times 0.25/100)$ €/MWh
1 MW < electrical nominal capacity • 6 MW	$85 \times (1 - (n - 2008) \times 0.25/100)$ E/MWh

n: Year of the first electricity feed-in

(h) What are the expected impacts in terms of energy production?

An increase in the renewable generation of electricity is desired.

(i) Is support conditional on meeting energy efficiency criteria?

No energy efficiency criteria are planned for new plants with this measure.

(j) Is it an existing measure? Could you please indicate national legislation regulating it?.

The measure exists and was last updated in 2008 through the 'Règlement grand-ducal du 8 février 2008 relatif à la production d'électricité basée sur les sources d'énergie renouvelables'.

(k) Is this a planned scheme? When would it be operational?

This is an existing measure.

(l) What start and end dates (duration) are set for the whole scheme?

The measures apply in their amended form since 1st January 2008.

(m) Are there maximum or minimum sizes of system which are eligible?

Maximum system sizes which are technology-specific within the framework of this measure are planned:

- Photovoltaic: 1 MW_p
- Biogas: 2500 kW
- Solid biomass : 5 MW
- Old and scrap wood: 5 MW
- Hydro energy: 6 MW

(n) Is it possible for the same project to be supported by more than one support measure? Which measures can be cumulated?

Plans which benefit from the above-mentioned feed-in tariffs can also benefit from investment incentives. The latter depends on the respective support recipient:

- ∩ Private individuals: 'Règlement grand-ducal du 20 avril 2009 instituant un régime d'aides pour la promotion de l'utilisation rationnelle de l'énergie et la mise en valeur des énergies renouvelables';
- ∩ Companies: 'Loi du 18 février 2010 relative à un régime d'aides à la protection de l'environnement et à l'utilisation rationnelle des ressources naturelles' or Loi du 30 juin 2004 portant création d'un cadre général des régimes d'aides en faveur du secteur des classés moyennes';
- ∩ Communities: 'Loi du 31 mai 1999 portant institution de fonds pour la protection de l'environnement and Circulaire n° 2489 du 20 avril 2005';
- ∩ Agricultural operations: 'Loi du 18 avril 2008 concernant le renouvellement du soutien au Développement rural'.

(o) Are there regional / local schemes? If so, please detail using the same criteria.

There are no local measures within this framework.

Specific questions for feed-in fixed tariffs:

(a) What are the conditions to get the fixed tariff?

Electricity feed-in tariffs are available for the following technologies:

- Photovoltaic
- Biogas
- Sewage gas
- Solid biomass
- Old and scrap wood
- Wind energy
- Hydro energy

New plants which are based on these technologies can receive the fixed feed-in tariff if the first electricity feed-in into the electricity grid was after 1st January 2008.

(b) Is there a cap on the total volume of electricity produced per year or of installed capacity that is entitled to the tariff?

No there is no cap for this.

(c) Is it a technology specific scheme? What are the tariff levels for each?

The corresponding information is already contained in the answers under Point (g) of this chapter.

(d) Are there other criteria differentiating tariffs?

Yes, the tariffs are specific to performance.

(e) For how long is the fixed tariff guaranteed?

The feed-in tariff applies to new plants during a time period of 15 years after the first feed-in into the electricity grid.

(f) Is there any tariff adjustment foreseen in the scheme?

The Ministry of Economic Affairs and Foreign Trade regularly checks the necessity of a tariff adjustment.

4.4. Support schemes to promote the use of energy from renewable resources in heating and cooling applied by the Member State or a group of Member States

Please follow the structure of point 4.3 and apply the questions to the support measures provided for renewable energy use in the heating and cooling sector. Please address the following additional points:

(a) How are the support schemes for electricity from renewable energy sources adapted to encourage the use of CHP from renewable energy sources?

The mechanism to support the heating from CHP plants is generally integrated into the feed-in tariff for renewable energies (see under Point (g) in the chapter “Feed-in tariff for electricity from renewable energy sources”).

(b) What support schemes are in place to encourage the use of district heating and cooling using renewable energy sources?

With the construction of a local heating grid based on renewable heat generation, the circular ‘Circulaire n° 2489 du 20 avril 2005’ on ‘Loi du 31 mai 1999 portant institution d’ un fonds pour la protection de l’Environnement’ provides for a subsidy of 33% of the investment costs. This assistance applies to communities and community syndicates.

With connection to a local heating grid, the ‘Règlement grand-ducal du 20 avril 2009 instituant un régime d’aides pour la promotion de l’utilisation rationnelle de l’énergie et la mise en valeur des énergies renouvelables’ provides for the following investment incentives for private individuals:

CONNECTION TO LOCAL HEATING GRID

Use	Assistance (%)	Conditions
Single-unit house	50 E/kW	Heating grid supplied with min. 75 % from renewable energies maximum subsidisable connection load: load: a) Existing single-unit house • 20 kW (max. 1000 E) a) New construction • 15 kW (max. 750 €)
Multi-unit house	15 E/kW per flat	Heating grid supplied with min. 75% from renewable energies maximum subsidisable connection load: a) Flat in existing Residential building • 12 kW (max. 180 E) b) New construction • 8 kW (max. 120 €)

The promotion refers to the connection costs, the heat transfer station, the peripherals and the installation costs.

Investment assistance for local heating grids is provided within the framework of the 'Loi du 18 février 2010 relative à un régime d'aides à la protection de l'environnement et à l'utilisation rationnelle des ressources naturelles'.

(c) What support schemes are in place to encourage the use of small-scale heating and cooling from renewable energy sources?

With small scale heating generation from renewable energy sources, the 'Règlement grand-ducal du 20 avril 2009 instituant un régime d'aides pour la promotion de l'utilisation rationnelle de l'énergie et la mise en valeur des énergies renouvelables' provides for the following investment incentives for private individuals:

SOLAR THERMAL SYSTEM

Thermal solar systems for non-potable water heating

Use	Assistance (%)	Maximum (€)	Conditions
Single-unit house	50	3000	Heat meter
Multi-unit house	50	3000/ flat, • 15 000 / Multi-unit house	Heat meter

Thermal solar systems for non-potable water heating and heating support

Use	Assistance (%)	Maximum (€)	Conditions
Single-unit house	50	5000	Heat meter
Multi-unit house	50	5000 / flat, • 15 000 / Multi-unit house	Heat meter

The installation of a thermal solar system in combination with wood heating which meets the requirements of the Règlement grand-ducal du 20 avril 2009, is additionally supported with a flat rate subsidy of 300 €

The promotion refers to material costs (solar collectors, installation system, pipes with thermal insulation, solar storage, heat meters and peripherals) and the installation costs.

WOOD HEATING

Central heating with wood pellets, wood chips or straw

Use	Assistance (%)	Maximum (€)	Conditions
Single-unit house	30	4000	Power and combustion control, automatic feeding and ignition
Multi-unit house	30	4000 / flat • 20,000 / Multi-unit haul	Power and combustion control, automatic feeding and ignition

Wood pellet oven (with heat extraction in the heating circuit of the central heating)

Use	Assistance (%)	Maximum (€)	Conditions
Single-unit house	30	2500	Heat extraction in the heating circuit -• 50%, Power and combustion control

Central split log heating

Use	Assistance (%)	Maximum (€)	Conditions
Single-unit house	25	2500	Power and combustion control Buffer • 55 WkW
Multi-unit house	25	2000/ flat • 10,000 / Multi-unit house	Power and combustion control Buffer • 55 WkW

Fulfilment of the following criteria must be verified by a certificate from the heating technician:

- CO-emissions • 250 mg/m³ (nominal load condition)
- Particle emissions • 50mg/rn³ (nominal load condition)
- Boiler efficiency • 90% or firing efficiency of the. Wood pellet ovens • 90%

The installation of a wood heating system in combination with a thermal solar system which meets the requirements of the Règlement grand-ducal du 20 avril 2009, is additionally supported with a flat rate subsidy of 300 €

The support refers to the material costs (boiler or oven and peripherals) and the installation costs.

HEAT PUMPS

Geothermal heat pump (earth probes or ground collectors)

Use	Assistance (%)	Maximum (€)	Conditions
Single-unit house	40	6000	Use only for heating purposes, COP value B0/W35 > 4.2, max. flow temperature: 35°C

Multi-unit house	40	4000 / flat, • 20 000 / Multi-unit house	Use only for heating purposes, COP value BO/W35 > 4.2, max. flow temperature: 35°C
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Air

Use	Assistance (%)	Maximum (€)	Conditions
Single-unit house	40	3000	Use only for heating purposes, must be upstream COP value A7/W35 > 3.3, max. flow temperature: 35°C
Multi-unit house	40	2000 / flat, • 10,000 / Multi-unit house	Use only for heating purposes, Geothermal exchanger must be upstream COP value A7/W35 > 3.3, max. flow temperature: 35°C

The support refers to the material costs (heat pump and peripherals), the deep drilling and the installation costs.

MICRO CHP

Combustion motor, Stirling motor, fuel cells

Assistance (%)	Maximum (€)	Conditions
25	3000	Electric nominal capacity between 1 and 6 kW, fuel or heating source from renewable energies (except for fuel cells), Annual degree of use > 85%, annual operational hours > 5000 hours, dimensioning according to VDI 3985 and VDI 2067- sheet 7; basic load is not greater than 30% of the maximum thermal building load, joint use of the heating and electricity, use of an

The support refers to the material costs (micro combined heat and power modules and peripherals) and to the installation costs.

(d) What support schemes are in place to encourage the use of heating and cooling from renewable energy sources in industrial applications?

There are promotion measures planned within the framework of the 'Loi du 18 février 2010 relative à un régime d'aides à la protection de l'environnement et à l'utilisation rationnelle des ressources naturelles'.

Financial support

Financial support can be classified in various ways.

Examples are: financial support for investment, capital grants, low interest loans, tax exemptions or reductions, tax refunds, tender schemes, renewable energy obligations with or without green certificates (tradable green certificates), feed-in tariffs, feed-in premiums, voluntary schemes.

For any scheme you use, please give a detailed description answering the following questions:

Investment assistance for private individuals

(a) What is the name and a short description of the scheme?

Investment assistance is granted within the framework of a five-year promotion plan ('Règlement grand-ducal du 20 avril 2009 instituant un régime d'aides pour la promotion de l'utilisation rationnelle de l'énergie et la mise en valeur des énergies renouvelables'). The corresponding investment must be effected between 1st January 2008 and 31st December 2012. The support must be submitted to the Environmental Administration using an application form. The statute of limitations for the support application is 2 years from the 31st December of the calendar year in which the investment was effected.

Private individuals can apply for investment incentives in the area of heating generation from renewable energy sources for the following technology: solar thermal energy, wood heating, heat pumps, micro CHPs, and connection to the local heating grid.

(b) Is it a voluntary or obligatory scheme?

This is a voluntary measure.

(c) Who manages the scheme? (Implementing body, monitoring authority)

The measure is managed by the Ministry for sustainable Development and Infrastructure and the Environmental Administration.

(d) What are the measures taken to ensure availability of necessary budget/funding to achieve the national target?

The funding is determined by the annual budget law.

(e) How is long-term security and reliability addressed by the scheme?

The term for the promotion programme is 5 years.

(f) Is the scheme periodically revised? What kind of feed-back or adjustment mechanism exists? How has the scheme been optimised so far?

The Environmental Administration keeps statistics on the number of supported projects. The promotion programme has been in existence since 2001 and has been adjusted several times when needed.

(g) Does support differ according to technology?

The support is specific to the technology. Details can be found in the following tables:

SOLAR THERMAL ENERGY

Thermal solar systems for non-potable water heating

Use	Assistance (%)	Maximum (€)	Conditions
Single-unit house	50	3000	Heat meter
Multi-unit house	50	3000 / flat, • 15 000 / Multi-unit house	Heat meter

Thermal solar systems for non-potable water heating and heating support

Use	Assistance (%)	Maximum (€)	Conditions
Single-unit house	50	5000	Heat meter
Multi-unit house	50	5000/ Flat, • 15 000 / Multi-unit house	Heat meter

The installation of a thermal solar system in combination with a wood heating which meets the requirements of the 'Règlement grand-ducal du 20 avril 2009 instituant un régime d'aides pour la promotion de l'utilisation rationnelle de l'énergie et la mise en valeur des énergies renouvelables', is additionally supported with a flat rate subsidy of 300 €

The support refers to the material costs (solar collectors, installation system, pipes with thermal insulation, solar storage, heat meter and peripherals) and the installation costs.

WOOD HEATING

Central heating with wood pellets, wood chips or straw

Use	Assistance (%)	Maximum (€)	Conditions
Single-unit house	30	4000	Power and combustion control, automatic feeding and ignition

Multi-unit house	30	4000 / flat • 20,000 / Multi-unit house	Power and combustion control, automatic feeding and ignition
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Wood pellets (with heat extraction in the heating circuit of the central heating)

Use	Assistance (%)	Maximum (€)	Conditions
Single-unit house	30	2500	Heat extraction in the heating circuit • 50%, Power and combustion control

Central split log heating

Use	Assistance (%)	Maximum (€)	Conditions
Single-unit house	25	2500	Power and combustion control, Buffer • 55 l/kW
Multi-unit house	25	2000 / flat • 10,000/ Multi-unit house	Power and combustion control, Buffer • 55 l/kW

The fulfilment of the following criteria must be verified with a certificate from a heating technician:

- CO-emissions • 250 mg/m³ (nominal load condition)
- Particle emissions • 50mg/m² (nominal load condition)
- Boiler efficiency • 90% or firing efficiency of the wood pellet oven • 90%

The installation of a wood heating system in combination with a thermal solar system, which meet the requirements of the Règlement grand-ducal du 20 avril 2009, is additionally supported with a flat rate subsidy of 300 €

The support refers to the material costs (boiler or oven and peripherals) and the installation costs.

HEAT PUMPS

Geothermal heat pump (earth probes or ground collectors)

Use	Assistance (%)	Maximum (€)	Conditions
Single-unit house	40	6000	Use only for heating purposes, COP value, BO/W35 > 4.2, max. flow temperature:
Multi-unit house	40	4000 / flat, • 20,000 / Multi-unit house	Use only for heating purposes, COP value, BO/W35 > 4.2, max. flow temperature:

Air source heat pump

Use	Assistance (%)	Maximum (€)	Conditions
Single-unit house	40	3000	Use only for heating purposes, geothermal heat exchanger, Must be upstreamed COP value A7/W35 > 3.3, max. flow
Multi-unit house	40	2000 / flat, • 10,000 / Multi-unit house	Use only for heating purposes, geothermal heat exchanger, Must be upstreamed COP value A7/W35 > 3.3, max. flow

The support refers to the material costs (heat pumps and peripherals), the deep drilling and the installation costs installation costs.

MICRO CHP

Combustion motor, Stirling motor, fuel cells

Assistance (%)	Maximum (€)	Conditions
25	3000	Electric nominal capacity between 1 and 6 kW, fuel or heating source from renewable energies (except for fuel cells), Annual degree of use > 85%, annual operational hours > 5000 hours, dimensioning according to VDI 3985 and VDI 2067- sheet 7; basic load is not greater than 30% of the maximum thermal building load, joint use of the heating and electricity, use of an emergency cooler is not allowed,

The support refers to the material costs (micro CHP modules and peripherals) and to the installation costs.

CONNECTION TO LOCAL HEATING GRID

Use	Assistance €	Conditions
Single-unit house	50 €/kW	Heating supplied by a min. 75% energies, Maximum subsidisable connection performance a) Existing single-unit house • 20 ^{1-XX} (max. 1000 €) b) New construction is 15 kW (max. 750 €)
Multi-unit house	15 €/kW per flat	Heating grid supplied at a min. 75% from renewable energies renewable Maximum subsidisable connection performance: a) Flat in existing residential building 12 kW (max. 180 E) b) New construction is 8 kW (max. 120 €)

The support refers to the connection costs of the heat transfer station, the peripherals and the installation costs.

(h) What are the expected impacts in terms of energy production?

An increase in renewable heating production is desired.

(i) Is support conditional on meeting energy efficiency criteria?

The specified conditions, including efficiency criteria, must be met during the installation of the system in order to be able to receive the support.

(j) Is it an existing measure? Could you please indicate national legislation regulating it.

The measure was introduced in 2001 through a decree and last updated in 2009. The current legislation is the 'Règlement grand-ducal du 20 avril 2009 instituant un régime d'aides pour la promotion de rationnelle de l'énergie et la mise en valeur des énergies renouvelables'.

(k) Is this a planned scheme? When would it be operational?

This is an existing measure.

(l) What start and end dates (duration) are set for the whole scheme?

In order to take advantage of the scheme, a related investment must be effected between 1st January 2008 and 31st December 2012.

(m) Are there maximum or minimum sizes of system which are eligible?

The maximum subsidisable connection performance for a connection to the local heating grid with single-unit houses is as follows:

- a) Existing single-unit house • 20 kW (max. 1000 E)
- b) New construction • 15 kW (max. 750 E)

The maximum subsidisable connection performance for connection to the local heating grid with multi-unit houses is as follows:

- a) Flat in existing residential building • 12 kW (max. 180 €)
- b) New construction • 8 kW (max. 120 E)

For a micro CHP, the electrical nominal capacity must be between 1 and 6 kW in order to be eligible for financial assistance.

- (n) Is it possible for the same project to be supported by more than one support measure? Which measures can be cumulated?**

A micro CHP which receives assistance can also take advantage of the feed-in tariff for electricity from renewable energy sources, based on the 'Règlement grand-ducal du 8 février 2008 relatif à la production d'électricité basé sur les sources d'énergie renouvelables'.

- (o) Are there regional / local schemes? If so, please detail using the same criteria.**

Diverse communities provide their own support scheme.

Specific questions on financial support for investments:

- (a) What is granted by the scheme? (subsidies, capital grants, low interest loans, tax exemption or reduction, tax refunds)**

The measures offer investment incentives.

- (b) Who can benefit from this scheme? Is it specified for certain technology(/ies)?**

Private individuals can benefit from the measures. In the area of heat generation from renewable energy sources, the measures apply to solar thermal energy, wood heating, heating pumps, micro CHPs and connections to the local heat grid.

- (c) Are applications continuously received and granted or are there periodical calls? If periodical, could you please describe the frequency and conditions?.**

Applications are accepted continuously.

Investment assistance for companies (1)

- (a) What is the name and a short description of the scheme?**

Investment assistance for companies is managed with the framework of the 'Régimes d'aides à la protection de l'environnement et à l'utilisation rationnelle des ressources naturelles'. The amount of assistance is specified in the 'Loi du 18 février 2010 relative à un régime d'aides à la protection de l'environnement et à l'utilisation rationnelle des ressources naturelles'. The application must be submitted to the Ministry for Economic Affairs and Foreign Trade before effecting the investments or expenditures involved.

(b) Is it a voluntary or obligatory scheme?

This is a voluntary scheme.

(a) Who manages the scheme? (*Implementing body, monitoring authority*)

The measure is managed by the Ministry of Economic Affairs and Foreign Trade together with an expert commission set up for this purpose.

(d) What are the measures taken to ensure availability of necessary budget/funding to achieve the national target?

The funding is annually determined using the budget law.

(e) How is long-term security and reliability addressed by the scheme?

The promotion programme is checked regularly by the expert commission set up for this purpose.

(f) Is the scheme periodically revised? What kind of feed-back or adjustment mechanism exists? How has the scheme been optimised so far?

The promotion programme has been in existence since 2004 and was last amended in 2010.

(g) Does support differ according to technology?

The amount of support is determined by an expert commission specific to the technology and project taking the EU support framework. Detailed guidelines have been worked out.

(h) What are the expected impacts in terms of energy production?

An increase in renewable heating production is desired.

(i) Is support conditional on meeting energy efficiency criteria?

Energy efficiency criteria are included in the guidelines.

(j) Is it an existing measure? Could you please indicate national legislation regulating it?

The measures were introduced in 2004 and amended by the 'Loi du 18 revrier 2010 relative à un régime d'aides à la protection de l'environnement et à l'utilisation rationnelle des ressources naturelles'.

(k) Is this a planned scheme? When would it be operational?

This is an existing scheme.

(l) What start and end dates (duration) are set for the whole scheme?

The measures will apply until 31st December 2013.

(m) Are there maximum or minimum sizes of system which are eligible?

Within the framework of these measures, there is no maximum or minimum system size planned.

(n) Is it possible for the same project to be supported by more than one support measure? Which measures can be cumulated?

Such a project which is promoted here can also take advantage of the feed-in tariff for electricity from renewable energy sources, based on the 'Règlement grand-ducal du 8 février 2008 relatif à la production d'électricité basée sur les sources d'énergie renouvelables' provided that it is coupled with the generation of electricity.

- (o) **Are there regional / local schemes? If so, please detail using the same criteria.**

There are no local measures within this framework.

Specific questions for the financial support for investments:

- (a) **What is granted by the scheme? (subsidies, capital grants, low interest loans, tax exemption or reduction, tax refunds)**

The measures offer investment incentives.

- (b) **Who can benefit from this scheme? Is it specified for certain technology(/ies)?**

Companies can benefit from the measures. The measures apply to all technologies in the area of energy production based on renewable energy sources.

- (c) **Are applications continuously received and granted or are there periodical calls? If periodical, could you please describe the frequency and conditions?**

Applications are accepted continuously.

Investment assistance for companies (2)

- (a) **What is the name and a short description of the scheme?**

Investment assistance for small and medium-sized companies is granted within the framework of the 'Régimes d'aides en faveur du secteur des classes moyennes'. The amount of the assistance is specified in the 'Loi du 30 juin 2004 portant création d'un cadre général des régimes d'aides en faveur du secteur des classes moyennes'. The application must be submitted to the Ministry of Middle Classés and Tourism.

- (b) **Is it a voluntary or obligatory scheme?**

This is a voluntary measure.

- (c) **Who manages the scheme? (Implementing body, monitoring authority)**

The measure is managed by Ministry of Middle Classés and Tourism together with an expert commission set up for this purpose.

- (d) **What are the measures taken to ensure availability of necessary budget/funding?**

The funding is determined using the annual budget law.

- (e) **How is long-term security and reliability addressed by the scheme?**

The promotion programme is checked regularly by the expert commission set up for the purpose.

- (f) Is the scheme periodically revised? What kind of feed-back or adjustment mechanism exists? How has the scheme been optimised so far?**

The support programme is checked regularly by the expert commission set up for this purpose.

- (g) Does support differ according to technology?**

The amount of support is determined specific to technology and project by the expert commission taking the EU support framework into account.

- (h) What are the expected impacts in terms of energy production?**

An increase in the renewable heating production is desired.

- (i) Is support conditional on meeting energy efficiency criteria?**

Energy efficiency criteria can be taken into consideration by the expert commission.

- (j) Is it an existing measure? Could you please indicate national legislation regulating it?**

The measure was introduced in 2004 by the 'Loi du 30 juin 2004 portant creation d'un cadre général des régimes d'aides en faveur du secteur des classés moyennes' and implemented by the 'Règlement grand-ducal du 24 novembre 2005 portant execution de [l'article 4 de la loi du 30 juin 2004 portant creation d'un cadre général des régimes d'aides en faveur du secteur des classés moyennes et instituant un régime d'aides en vue d'encourager et de soutenir les entreprises luxembourgeoises en matiere de protection de l'environnement et d'utilisation rationnelle des ressources naturelles'.

- (k) Is this a planned scheme? When would it be operational?**

This is an existing measure.

- (l) What start and end dates (duration) are set for the whole scheme?**

The measure has applied since its introduction in June 2004.

- (m) Are there maximum or minimum sizes of system which are eligible**

There is no maximum or minimum size for systems within the framework of this scheme.

- (n) Is it possible for the same project to be supported by more than one support measure? Which measures can be cumulated?**

A project supported here can also benefit from the feed-in tariff for electricity from renewable energy sources, based on the 'Règlement grand-ducal du 8 février 2008 relatif à la production crelectricite basée sur les sources d'energie renouvelables' provided that it is coupled with the generation of electricity.

- (o) Are there regional / local schemes? If so, please detail using the same criteria.**

There are no local measures within this framework

Specific questions for the financial support for investments:

- (a) **What is granted by the scheme? (subsidies, capital grants, low interest loans, tax exemption or reduction, tax refunds)**

The measures offer investment incentives.

- (b) **Who can benefit from this scheme? Is it specified for certain technology(/ies)?**

Small and medium-sized companies can benefit from the measure. The measure applies for all technologies in the area of renewable energy sources.

- (c) **Are applications continuously received and granted or are there periodical calls? If periodical, could you please describe the frequency and conditions?**

Applications are accepted continuously.

Investment assistance for communities

- (a) **What is the name and a short description of the scheme?**

Investment assistance is granted within the framework of the 'Fonds pour la protection de l'environnement' ('Loi du 31 mai 1999 portant institution d'un fonds pour la protection de l'environnement'). The amount of support is established in the circular (Circulaire n° 2489 du 20 avril 2005). The application must be submitted to the Ministry for Sustainable Development and Infrastructure before the start of the work. This will be inspected by a committee upon completion.

Communities can apply for investment incentives in the area of heating generation from renewable energy sources for the following technologies: solar thermal systems, bioenergy, local heating grid.

- (b) **Is it a voluntary or obligatory scheme?**

This is a voluntary measure.

- (c) **Who manages the scheme? (implementing body, monitoring authority)**

The measure is managed by the Ministry for Sustainable Development and Infrastructure together with the committee set up for this purpose, the 'Comité de gestion du fonds pour la protection de l'environnement'.

- (d) **What are the measures taken to ensure availability of necessary budget/funding?**

The availability of adequate funding is ensured by the 'Fonds pour la protection de l'environnement'.

- (e) **How is long-term security and reliability addressed by the scheme?**

The support programme is regularly checked by the committee set up for this purpose.

- (f) **Is the scheme periodically revised? What kind of feed-back or adjustment mechanism exists? How has the scheme been optimised so far?**

The support programme is checked regularly by the committee set up for this

purpose.

(g) Does support differ according to technology?

The support is technologically-specific:

SOLAR THERMAL ENERGY

A thermal solar system with or without heating support is eligible for financial assistance of 33% of the investment. The same applies for a long-term storage.

LOCAL HEATING GRID

A local heating grid is eligible for financial assistance of 33% of the investment costs in the case of renewable heating generation. Digging work is not eligible for assistance.

BIOENERGY

An energy centre for electricity and heat generation from biomass is eligible for financial assistance of 33% of the investment costs.

A heating centre for heating generation from biomass is eligible for financial assistance of 33% of the investment costs. The following plants/systems are eligible:

- Wood chipping heating systems,
- Wood pellet heating systems,
- Wood gasifier systems.

(h) What are the expected impacts in terms of energy production?

An increase in renewable heating production is desired.

(i) Is support conditional on meeting energy efficiency criteria?

Energy efficiency criteria can be considered by the committee.

(j) Is it an existing measure? Could you please indicate national legislation regulating it?

The measure was introduced in 2005 by the circular, the 'Circulaire n° 2489 du 20 avril 2005' based on the 'Loi du 31 mai 1999 portant institution d'un fonds pour la protection de l'environnement'.

(k) Is this a planned scheme? When would it be operational?

This is an existing measure.

(l) What start and end dates (duration) are set for the whole scheme?

The measure has been in existence since 1st January 2005.

(m) Are there maximum or minimum sizes of system which are eligible?

There is no maximum or minimum size for systems within the framework of this scheme.

(n) Is it possible for the same project to be supported by more than one

support measure? Which measures can be cumulated?

A project supported here can also benefit from the feed-in tariff for electricity from renewable energy sources, based on the 'Règlement grand-ducal du 8 février 2008 relatif à la production d'électricité issue sur les sources d'énergie renouvelables' provided that it is coupled with the generation of electricity.

- (o) **Are there regional / local schemes? If so, please detail using the same criteria.**

There are no local measures in this framework.

Specific questions on the financial support for investments:

- (a) **What is granted by the scheme? (subsidies, capital grants, low interest loans, tax exemption or reduction, tax refunds)**

The measures offer investment incentives.

- (b) **Who can benefit from this scheme? Is it specified for certain technology(/ies)?**

Communities and community syndicates can benefit from the measure. In the area of heating generation from renewable energy sources, the measure applies to solar thermal systems, local heating grids, wood chipping heating systems, wood pellet heating systems, wood gasifier systems as well as energy centres for the generation of electricity and heating from biomass.

- (c) **Are applications continuously received and granted or are there periodical calls? If periodical, could you please describe the frequency and conditions?**

Applications are accepted continuously.

Investment assistance for agricultural operations

- (a) **What is the name and a short description of the scheme?**

Investment assistance for agricultural operations is granted within the framework of the 'Soutien au Développement rural'. The amount of assistance is established in the 'Loi du 18 avril 2008 concernant le renouvellement du soutien au développement rural'.

- (b) **Is it a voluntary or obligatory scheme?**

This is a voluntary measure.

- (c) **Who manages the scheme? (implementing body, monitoring authority)**

The measure is managed by the Ministry for Agriculture, Viticulture and Rural Development together with the by the expert commission set up for this purpose, the 'Commission économique et technique'.

- (d) **What are the measures taken to ensure availability of necessary budget/funding?**

The availability of adequate funding is ensured by the 'Fonds d'orientation économique et social pour l'agriculture'.

- (e) **How is long-term security and reliability addressed by the scheme?**

The support programme is regularly checked by the expert commission set up for this purpose.

(f) Is the scheme periodically revised? What kind of feed-back or adjustment mechanism exists? How has the scheme been optimised so far?

The support programme has been in existence since 2001 and was last updated in 2009.

(g) Does support differ according to technology?

The support applies to investments in the following technologies in the area of heating generation based on renewable energy sources:

- biogas plants which produce electricity and heat based on a combined heat and power system
- biogas plants which process biogas to natural gas quality and feed it into the natural gas grid
- heat pumps
- heating plants based on wood or other renewable fuels (for the buildings of agricultural operations)

(h) What are the expected impacts in terms of energy production?

An increase in renewable heating production is desired.

(i) Is support conditional on meeting energy efficiency criteria?

Yes, plants which produce electricity and heating based on a combined heat and power system, must further use 50% of the produced and heating which is not self-used in order to be eligible for the support. Additionally self-igniting motors may not be operated with fossil fuels in order to be eligible for assistance.

(j) Is it an existing measure? Could you please indicate national legislation regulating it?

This is an existing measure.

The measure has been in existence since 1st January 2007.

(k) Is this a planned scheme? When would it be operational?

This is an existing measure.

(l) What start and end dates (duration) are set for the whole scheme?

The measures have applied since 1st January 2007 and for a time period of 7 years.

(m) Are there maximum or minimum sizes of system which are eligible

There is no maximum or minimum size for systems within the framework of this scheme.

(n) Is it possible for the same project to be supported by more than one support measure? Which measures can be cumulated?

A project support here can also benefit from the feed-in tariff for electricity from renewable energy sources, based on the 'Règlement grand-ducal du 8 février 2008 relatif à la production d'électricité basée sur les sources d'énergie renouvelables' provided that it is coupled with the generation of electricity.

- (o) **Are there regional / local schemes? If so, please detail using the same criteria.**

There are no local measures within this framework.

Specific questions for the financial support for investments:

- (a) **What is granted by the scheme? (subsidies, capital grants, low interest loans, tax exemption or reduction, tax refunds)**

The measures offer investment incentives.

- (b) **Who can benefit from this scheme? Is it specified for certain technology (/ies)?**

Agricultural operations can benefit from the measure. The measure applies to investments in the following technologies in the area of heating generation based on renewable energy sources:

-biogas plants which produce electricity and heat based on a combined heat and power system

- biogas plants which process biogas to natural gas quality and feed it into the natural gas grid

pumps

- heating plants based on wood or other renewable fuels (for the buildings of the agricultural operations).

- (c) **Are applications continuously received and granted or are there periodical calls? If periodical, could you please describe the frequency and conditions?**

Applications are accepted continuously.

4.5. Support schemes to promote the use of energy from renewable resources in transport applied by the Member State or a group of Member States

Please follow the structure of point 4.3 and apply the questions the support measures provided for renewable energy use in the transport sector. Please make distinctions according to transport modes (such as road transport, non-road land transport).

Please address the following additional points:

- (a) **What are the concrete obligations / targets per year (per fuel or technology)?**

Currently there is an admixture requirement for all diesel and petrol in effect which should lead to an increased use of energy from renewable sources in the transport sector. The 'Loi du 18 décembre 2009 concernant le budget des recettes et des dépenses de l'Etat pour l'exercice 2010' provides for, in this sense, that in 2010, biofuels make up at least 2% of the old fuels, calculated on the basis of the heat value of the fuel. Up to now the admix rate has been established annually. The present Action Plan should serve as a guideline for the use of the instruments of the admix rate in the years 2011 to 2020. The admix obligation should be expanded as soon as possible with sustainability criteria contained in the Directive 2009/28/EC.

- (b) **Is there differentiation of the support according to fuel types or technologies? Is there any specific support to biofuels which meet the**

criteria of Article 21(2) of the directive?

Up to now there has not been a fuel-typical or technological differentiation in the Luxembourg Instrumentarium. There is also not a targeted promotion for biofuels in effect which fulfils the criteria of Article 21(2) of the directive. The current instrumentarium plans to expand the sustainability criteria through the implementation of Directive 2009/28/EC.

Legislation

Regulation can set target(s) and obligations. In case there is such an obligation please detail it:

(a) What is the legal basis for this obligation/target?

The legal basis is the 'Loi du 18 decembre 2009 concernant le budget des recettes et des cidpenses de l'Etat pour l'exercice 2010'.

(b) Are there any technology-specific targets?

There are no technology-specific targets.

(c) What are the concrete obligations/targets per year (per technology)?

The 'Loi du 18 decembre 2009 concernant le budget des recettes et des depenses de l'Etat pour l'exercice 2010' provides for biofuel to make up at least 2% of the old fuel calculated on the basis of the heat value of the fuel.

(d) Who has to fulfil the obligation?

The obligations must be complied with by the companies which sell the fuel in Luxembourg.

(e) What is the consequence of non-fulfilment?

If there is failure to comply in the planned obligation, the company must pay a penalty in the amount of 1,200 Euros/1,000 litres. The amount of the penalty is calculated by subtracting the biofuel amount actually used from the biofuel total amount which should have been used.

(f) Is there any mechanism to supervise fulfilment?

The Environmental Administration has been assigned to monitor the admix obligation. The customs administration ('Administration des douanes et accises') is responsible for any penalty payments which are levied if applicable, by the Environmental Administration.

(g) Is there any mechanism to modify obligations / targets?

Within the framework of the implementation of Directive 2009/28/EC, the further targets and obligations will be determined in the area of biofuel admixtures.

Financial support

Financial support can be classified in various ways.

Examples are: financial support for investment, capital grants, low interest loans, tax exemptions or reductions, tax refunds, tender schemes, renewable energy obligations with or without green certificates (tradable green certificates), feed-in tariffs, feed-in premiums, voluntary schemes.

For any scheme you use, please give a detailed description answering the following questions:

Investment assistance for companies (1)

(a) What is the name and a short description of the scheme?

Investment assistance for companies is granted within the framework of the ‘Régimes d'aides à la protection de l'environnement et à l'utilisation rationnelle des ressources naturelles’. The amount of the support is established in the ‘Loi du 18 février 2010 relative à un régime d'aides à la protection de l'environnement et à l'utilisation rationnelle des ressources naturelles’. The application must be submitted to the Ministry of Economic Affairs and Foreign Trade before the investment or expenditure involved is affected.

(b) Is it a voluntary or obligatory scheme?

This is a voluntary measure.

(c) Who manages the scheme? (Implementing body, monitoring authority)

The measure is managed by the Ministry for Economic Affairs and Foreign Trade together with an expert commission set up for this purpose.

(d) What are the measures taken to ensure availability of necessary budget/funding?

The funding is established by the annual budget law.

(e) How is long-term security and reliability addressed by the scheme?

The support programme is regularly checked by the expert commission set up for this purpose.

(f) Is the scheme periodically revised? What kind of feed-back or adjustment mechanism exists? How has the scheme been optimised so far?

The support programme has been in existence since 2004 and was last updated in 2010.

(g) Does support differ according to technology?

The amount of the support is determined by the expert commission specific to the technology and project and taking the EU investment incentives framework into account. Detailed guidelines are being drawn up.

(h) What are the expected impacts in terms of energy production?

A possible biofuel production is expected in Luxembourg.

(i) Is support conditional on meeting energy efficiency criteria?

Energy efficiency criteria are contained in the guidelines.

(j) Is it an existing measure? Could you please indicate national legislation regulating it?

The measure was introduced in 2004 and adjusted through the ‘Loi du 18 février 2010 relative à un régime d'aides à la protection de l'environnement et à

l'utilisation rationnelle des ressources naturelles'.

(k) Is this a planned scheme? When would it be operational?

This is an existing measure.

(l) What start and end dates (duration) are set for the whole scheme?

The measures will apply until 31st December 2013.

(m) Are there maximum or minimum sizes of system which are eligible?

There is no maximum or minimum size for systems within the framework of this scheme.

(n) Is it possible for the same project to be supported by more than one support measure? Which measures can be cumulated?

The investment incentives of the 'Loi du 18 février 2010 relative à un régime d'aides à la protection de l'environnement et à ('utilisation rationnelle des ressources naturelles' are cumulative with promotion measures for allowed costs that are not subject to this law.

(o) Are there regional / local schemes? If so, please detail using the same criteria.

There are no local measures in this framework.

Specific questions on the financial support for investments:

(a) What is granted by the scheme? (subsidies, capital grants, low interest loans, tax exemption or reduction, tax refunds)

The measures offer investment incentives.

(b) Who can benefit from this scheme? Is it specified for certain technology (/ies)?

Companies can benefit from the measure. The measure applies to all technologies in the area of energy production based renewable energy sources, including the production of sustainable biofuels.

(c) Are applications continuously received and granted or are there periodical calls? If periodical, could you please describe the frequency and conditions?

Applications are accepted continuously.

Investment assistance for agricultural operations

(a) What is the name and a short description of the scheme?

Investment assistance for agricultural operations is granted within the framework of the 'Soutien au Développement rural'. The amount of support is established in the 'Loi du 18 avril 2008 concernant le renouvellement du soutien au développement rural'.

(b) Is it a voluntary or obligatory scheme?

This is a voluntary measure.

(c) Who manages the scheme? (implementing body, monitoring authority)

The measure is managed by the Ministry for Agriculture, Viticulture and Rural Development together with the by the expert commission set up for this purpose, the 'Commission économique et technique'.

(d) What are the measures taken to ensure availability of necessary budget/funding?

The availability of adequate funding is ensured by the 'Fonds d'orientation économique et social pour l'agriculture'.

(e) How is long-term security and reliability addressed by the scheme?

The support programme is regularly checked by the expert commission set up for this purpose.

(f) Is the scheme periodically revised? What kind of feed-back or adjustment mechanism exists? How has the scheme been optimised so far?

The support programme has been in existence since 2001 and was last updated in 2009.

(g) Does support differ according to technology?

The support applies to investments in the following technologies in the area of energy production for the transport sector based on renewable energy sources: Plants which produce bioenergy with the exception of biogas (for example, production of biofuels,...)

(h) What are the expected impacts in terms of energy production?

A possible biofuel production is expected in Luxembourg.

(i) Is support conditional on meeting energy efficiency criteria?

Energy efficiency criteria can be taken into consideration by the expert commission.

(j) Is it an existing measure? Could you please indicate national legislation regulating it?

This is an existing measure.

(k) Is this a planned scheme? When would it be operational?

(l) What start and end dates (duration) are set for the whole scheme?

The measures have applied since 1st January 2007 and for a time period of 7 years.

(m) Are there maximum or minimum sizes of system which are eligible

There is no maximum or minimum size for systems within the framework of this scheme.

(n) Is it possible for the same project to be supported by more than one support measure? Which measures can be cumulated?

Several support measures can be cumulated within this framework is possible,

however only after approval of the responsible minister who consults with the government as well as the expert commission.

- (o) **Are there regional / local schemes? If so, please detail using the same criteria.**

There are no local measures within this framework.

Specific questions for the financial support for investments:

- (a) **What is granted by the scheme? (subsidies, capital grants, low interest loans, tax exemption or reduction, tax refunds)**

The measures offer investment incentives.

- (b) **Who can benefit from this scheme? Is it specified for certain technology (/ies)?**

Agricultural operations can benefit from the measure. The measure applies to investments in the following technologies in the area of energy production for the transport sector based on renewable energy sources:

Plants which produce bioenergy with the exception of biogas (for example, the production of biofuels,...)

- (c) **Are applications continuously received and granted or are there periodical calls? If periodical, could you please describe the frequency and conditions?**

Applications are accepted continuously.

4.6. Specific measures for the promotion of the use of energy from biomass

Biomass has an important role as primary energy in all the three sectors: heating and cooling, electricity and transport. National biomass strategy is crucial to plan the role and the interaction of uses between the energy end uses and interaction with other non-energy sectors. Therefore Member States are required to assess their domestic potential and increased mobilisation of domestic and imported biomass resources. The impact on and the interaction with other non-energy sectors (as the food and feed industry, pulp and paper industry, construction industry, furniture industry etc.) should be analysed.

4.6.1 Biomass supply: both domestic and trade

Under this point Member States should assess the supply of domestically available biomass and the need for imports.

There should be a distinction between biomass (A) from forestry – (1) direct and (2) indirect supply; (B) from agriculture and fisheries– (1)directly provided and (2)by-products / processed crops; and (C) from waste – (1)biodegradable fraction of municipal solid waste, (2) biodegradable fraction of industrial solid waste and (3) sewage sludge. Data is required for the above-mentioned first subcategories, while more detailed information is optional. However the aggregated figures shall reflect the following categorisation and give information in the units of Table 7. The role of imports (EU and non-EU) and exports (if possible, EU and non-EU) must be reflected.

Please note that wood chips, briquettes and pellets can be either from direct supply or from indirect supply from forestry. If information on pellets is included in the table, it should specify whether the raw material comes from direct or indirect supply.

In the case of biogas and biofuels the amount of raw feedstock should be detailed in Table 7, not the amount of processed feedstock. It is understood that for imports and exports the amount of biomass feedstocks for biofuels is more difficult to ascertain, and estimations may be necessary. Alternatively, if the information on imports is given on the basis of biofuel imports, it must be specified in the table.

Table 7: Biomass supply in 2006

Sector of origin		Amount of domestic resource ²⁸ 1000m ³	Imported	Exported	Net Amount 1000m ³	Primary energy production (ktoe)
			EU/ Non EU 1000m ³	EU/non-EU 1000m ³		
A) Biomass from forestry²⁹:	<i>Of which:</i>					
	1. direct supply of wood biomass from forests and other wooded land for energy generation	24.5	9.3	1.8	32.0	5.5
	<i>Optional - if information is available you can further detail the amount of feedstock belonging to this category:</i>	a) 17.0 b) + c) 7.5	a) 9.3 b) + c) 0.00	a) 1.8 b) + c) 0.00	a) 24.5 b) -+ c) 7.5	a) 4.20 b) + c) 1.3
	<i>a) fellings b) residues from fellings (tops, branches, bark, stumps) c) landscape management residues (woody biomass from parks, gardens, tree rows, bushes) d) other (please define)</i>	d) - ³⁰	d) -	d) -	d) -	d) -
	2. indirect supply of wood biomass for energy generation	250	-	150	100	17.1
<i>Optional - if information is available you can further detail:</i>	a) + c) 100 b) - d) 150 e) -	a) + c) - b) - d) 0 e) -	a) + c) - b) - d) 150 e) -	a) + c) 100 b) - d) 0 e) -	a) + c) 17.1 b) - d) 0 e) -	
B) Biomass from agriculture and fisheries:	<i>Of which:</i>	Unit:1000 t	Unit:1000 t	Unit:1000 t	Unit:1000 t	
	1. agricultural crops and fishery products directly provided for energy generation	16.6	-	-	16.6	4.5

	<i>Optional - if information is available you can further detail:</i> a) arable crops (cereals, oilseeds, sugar beet, silage maize) b) plantations c) short rotation trees c) other energy crops (grasses) d) algae e) other (please define)	a) 16.6 b) - c) - c) - d) - e) -	a) - b) - c) - c) - d) - e) -	a) - b) - c) - c) - d) - e) -	a) 16.6 b) - c) - c) - d) - e) -	a) 4.5 b) - c) - c) - d) - e) -)
	2. Agricultural by-products / processed residues and fishery by-products for energy generation	-	-	-	-	5.5
	<i>Optional - if information is available you can further detail:</i> a) straw b) manure c) animal fat d) meat and bone meal e) cake by-products (incl. oil seed and olive oil cake for energy) f) fruit biomass (including shell, kernel) g) fishery by product g) clippings from vines, olives, fruit trees h) other (please define)	a) - b) - c) - d) - e) - f) - g) - g) - h) 12.7	a) - b) - c) - d) - e) - f) - g) - g) - h)	a) - b) - c) - d) - e) - f) - g) - g) - h)	a) - b) - c) - d) - e) - f) - g) - g) - h) 12.7	a) - b) - c) - d) - e) - f) - g) - g) - h) 3.3
C) Biomass from waste:	<i>Of which:</i>	-	-	-	-	15.9
	1. Biodegradable fraction of municipal solid waste including bio waste (biodegradable garden and park waste, food and kitchen waste from households, restaurants, caterers and retail premises, and comparable waste from food processing plants) and landfill gas	52.9	-	-	52.9	14.8
	2. Biodegradable fraction of industrial waste (including paper, cardboard, pallets)	The categories C)1 and C)2 are not differentiated.				
	3. Sewage sludge	-	-	-	-	1.1

²⁸ Amount of the resource in m³ (if possible, otherwise in appropriate alternative units) for category A and its subcategories and in tonnes for categories B and C and their subcategories.

²⁹ Biomass from forestry should also include biomass from forest-based industries. Under the category of biomass from forestry processed solid fuels, such as chips, pellets and briquettes should be included in the corresponding subcategories of origin.

³⁰ For fields labelled with the symbol “—“ in Table 7, there is no data available.

Wood biomass available for energy production from forests and other wooded areas was at about 24,500 m³ in Luxembourg in 2006. Another 9,300 m³ of wood imports and 1,800 m³ wood exports into/out of the EU or the non-EU countries were added to this domestic production. At the same time, the available data does not differentiate between the EU countries and the non-EU countries with regard to imports and exports. Overall the amount of available wood directly from the forest was 32,000 m³ (5.5 ktoe).in 2006

From the directly usable wood amount, 17,000 m³ went to round cut wood volume in

Luxembourg. 9,300 m³ trunk wood was imported into Luxembourg and 1,800 m³ trunk wood was exported. In this way, 24,500 m³ of directly cut trunk wood remained in Luxembourg which corresponds to a primary energy production of 4.20 ktoe. Added to this is 7,500 m³ scrap wood directly from the forest (1.3 ktoe). Due to the data available, the categories 1b and 1c cannot be differentiated so that for both categories, only one value can be given. Further direct wood use categories could not be identified.

In addition to the direct wood use, there was also indirect wood use for the production of energy which affects, on the one hand was recycling wood (2d) and on the other hand, residues from wood processing among other things (2a, c). Here, it must be mentioned that the data availability on these types of indirect wood use is very limited. Based on experience and available information, it can be assumed that in Luxembourg there is about 75,000 t waste wood or recycling wood which corresponds to an amount of about 150,000 m³ per year. To date, this waste wood is not used for energy production in Luxembourg, but rather the entire wood amount is used in other European countries. That is why, the primary energy production from recycling wood is set at zero. Furthermore it is assumed that there was no import of recycling wood to Luxembourg.

There are also no official statistics in Luxembourg on the incurring indirect wood amounts in the industrial wood processing. Thus the indirect incurring wood amounts must be calculated which are used in Luxembourg for energy production from industrial wood amounts and the typical amounts of waste wood from sawmills (for example, about 40 % of the wood used) or the amounts of waste wood from wood processing

³¹ Pellets and wood chips are listed under rubric A.2. "wood biomass indirectly available for the energy generation"

This presumably corresponded to approx. 100,000 m³. In this way, a total amount of about 250,000 m³ of indirect waste wood or scrap wood could be applied which was used for energy production in Luxembourg. Of this, however, 150,000 m³ recycling wood was exported to other European countries. This means that in Luxembourg, about 100,000 m³ of indirect scrap wood was used for energy production.

In the category Biomass from agriculture and fisheries arable crops played the most important role for the energy production. Here industrial rape for the rape methyl ester production with 3,917 t to 1,152 ha (1.2 ktoe), the silage maize for biogas production with 8,924 t to 535 ha (2.3 ktoe) as well as several other crop cultures also for biogas production, with 3.803 t to 228 ha (1 ktoe) should also be listed. Together there was a primary energy production of 4.5 ktoe. Furthermore about 2.2 ktoe was obtained from manure.

The largest area of solid biomass for use to produce energy in the category waste biomass was the use of the biogenic waste part with an amount of approximately 46,000 t (about 13 ktoe). 5,471 t green waste (about 1.5 ktoe) used for energy, 1,095 t biological waste (about 0.08 ktoe) as well as 316 t waste cooking oil and fat (about 0.25 ktoe) is added here too. Furthermore approximately 1.1 ktoe was obtained from sludge.

Please explain the conversion factor/calculation methodology used above for the conversion of the amount of available resources to primary energy.

The following area yields have been estimated for the arable crops:

Yield silage maize	16.68 tTS/ha
Yield industrial rape	3.4 tTS/ha
Rape methyl ester yield	1.15 t/ha

The following yields have been estimated for the individual biomass types:

Biogas yield silage maize	577 Nm ³ /t TS
Biogas yield green waste	550 m ³ /t
Dry matter content biological waste	2.3 t waste per t TS
Biogas yield biological waster	350 m ³ /tTS
Conversion efficiency waste oil methyl ester	0.85

The following average heating values have been estimated:

Forest wood	7.15 al/m ³
Recycling wood	3.6 G.I/m ³
Rape and waste oil methyl ester	10.39 kWh/kg
Biogas (silage maize)	5.2 kWh/Nm ³
Biogas (green waste and biological waste)	6 kWh/m ³
Biogenic waste portion	3.3 MWh / t

Please specify on what basis the biodegradable fraction of municipal solid waste and of industrial waste was calculated.

Generally there is no differentiation in Luxembourg between household waste and industrial waste. The status quo of the Luxembourg refuse incineration was at 125,000 t of incinerated refuse. Taking a biogenic portion of 36.78% into account and a specific heating value of 3.3 kWh/kg waste, a primary energy production of the biogenic waste fraction of 152 GWh results.

Please use Table 7a to give an estimated contribution of biomass energy use in 2015 and 2020. (Following the categorisation used in Table 7.)

The information listed in Table 7a is based on the LUXRES Study (“Determination of the potentials and development of policies for the increased use of renewable energies in Luxembourg”) with regard to the category “expected amount of domestic resources” as well as use scenarios for renewable energies for the category “primary energy production” which are represented within the framework of this document.

Table 7a: Estimated biomass domestic supply in 2015 and 2020

Sector of origin		2015		2020	
		Expected amount of domestic resource	Primary energy production (ktoe)	Expected amount of domestic resource	Primary energy production (ktoe)
A) biomass from forestry:	1. direct supply of wood biomass from forests and other wooded land for energy generation.	27	24	44	40
	2. indirect supply of wood biomass for energy generation	32	25	41	67
B) Biomass from agriculture and fisheries:	1. agricultural crops and fishery products directly provided for energy generation	25	7	38	14
	2. Agricultural by-products / processed residues and fishery by-products for energy generation	20	18	34	25
C) Biomass from waste::	1. Biodegradable fraction of municipal solid waste including bio waste (biodegradable garden and park waste, food and kitchen waste from households, restaurants, caterers and retail premises, and comparable waste from food processing plants) and landfill gas	25	23	29	27
	2. Biodegradable fraction of industrial waste (including paper, cardboard, pallets)				
	3. Sewage sludge				

What is the estimated role of imported biomass up to 2020? Please specify the quantities expected (ktoe) and indicate possible import countries.

Biomass imports are expected especially in the category “wood biomass for the indirect generation of energy” in a volume of 45 ktoe in 2020. Possible supply countries will result from the respective market situation for these products in the future.

In addition to the information provided above, could you please describe the current situation of agricultural land used for dedicated energy production as follows:

Table 8: Current agricultural land use for production of crops dedicated to energy in 2006

Agricultural land use for production of dedicated energy crops	Surface (ha)
1) Land used for short rotation trees (willows, poplars)	0
2) Land used for other energy crops such as grasses (reed canary grass, switch grass, Miscanthus), sorghum	0

4.6.2. Measures to increase biomass availability, taking into account other biomass users (agriculture and forest-based sectors)

– Mobilisation of new biomass sources:

(a) Please specify how much land is degraded.

In Luxembourg there are no noteworthy degraded land recorded.

(b) Please specify how much unused arable land there is..

Fallow land can be seen as unused arable land. These areas currently represent approximately one-thousandth of the entire agricultural area in Luxembourg.

(c) Are any measures planned to encourage unused arable land, degraded land, etc. to be used for energy purposes?

In the areas mentioned, the planting of fast growing wood or plants could be supported (miscanthus, willow, poplar,...). Further measures are being analysed within the framework of the implementation of this plan.

(d) Is energy use of certain already available primary material (such as animal manure) planned?

In Luxembourg the following biogenic primary materials are already being used energy:

- Energy wood
- Old and scrap wood
- Manure
- Biogenic organic residue
- Sludge

Furthermore how the collection of organic waste (with regard to infrastructure, organisation,...) as well as the use of old and scrap wood can be improved is to be studied. Whether or not the current incentives, especially investment incentives and feed-in tariffs are adequate for biomass projects based on old and scrap wood as well as for projects based on organic waste is to be studied.

- (e) **Is there any specific policy promoting the production and use of biogas? What type of uses are promoted (*local, district heating, biogas grid, natural gas grid integration*)?**

The generation of electricity and feeding-in to the electricity grid by biogas plants is subsidised. Details on this can be found in Chapter 4.3 under the rubric “Feed-in tariffs for electricity from renewable energy sources”. In this case there are also investment incentives for biogas plants. Details on this are in Chapter 4.3 under the rubrics “Investment assistance for companies (1), - for companies (2), - for communities, - for agricultural businesses”.

It is planned to support biogas production and feed-in into the natural gas grid as soon as possible. The ‘Projet de règlement grand-ducal relatif à la production, la rémunération et la commercialisation de biogas’ is currently undergoing the regulatory procedure.

- (f) **What measures are planned to improve forest management techniques in order to maximise the extraction of biomass from the forest in a sustainable way ?³²: How will forest management be improved in order to increase future growth? What measures are planned to maximise the extraction of existing biomass that can already be put into practice?**

It is planned to improve the forest mobilization especially in private forests. Here, there is to be a greater focus on efficient management (for example, management plans, reforestation, maintenance of younger plants, replacement of coniferous forests,...) as well as the improvement and development of the forest infrastructures (for example, forest paths,...). Concrete activities and analyses are being initiated with the association of private forest owners.

– **Impact on other sectors:**

- (a) **How will the impact of energy use of biomass on other sectors based on agriculture and forestry be monitored? What are these impacts? (If possible, please provide information also on quantitative effects.) Is the monitoring of these impacts planned in the future?**

The preparation of an analysis of the interactions between the different uses of biomass and area use (among other things, competition analysis) is being looked into.

³²

Recommendations can be found in the report issued by the Standing Forestry Committee ad hoc Working Group II in July 2008 on Mobilisation and efficient use of wood and wood residues for energy generation. The report can be downloaded at: http://ec.europa.eu/agriculture/fore/publi/sfc_wgii_final_report_072008_en.pdf

An analysis of this type only seems to make sense in a broader framework due to the small size of the country.

- (b) **What kind of development is expected in other sectors based on agriculture and forest that could have an impact on the energy use? (E.g. could improved efficiency/ productivity increase or decrease the amount of by-products available for energy use?).**

Currently there are no known developments in Luxembourg which could have an impact on the energy use of biomass.

4.7. Planned use of statistical transfers between Member States and planned participation in joint projects with other Member States and third countries

– Under this subchapter the expected use of cooperation mechanisms between Member States and Member States and third countries has to be described. This information should draw on that provided in the forecast document referred to in Article 4.3 of Directive 2009/28/EC .

4.7.1. Procedural aspects

- (a) **Describe the national procedures (step by step) established or to be established, for arranging a statistical transfer or joint project (including responsible bodies and contact points).**

With the commencement of Directive 2009/28/EC, Luxembourg has actively looked into the theme of cooperation mechanisms and actively participated in the associated meetings at a European level. Juristic questions of the individual planned cooperation mechanisms have been analysed in detail and their applicability to Luxembourg studied. This approach is of special significance to Luxembourg because Luxembourg cannot achieve its targets with its national potentials and is dependent on cooperation mechanisms. Using an analysis of forecasts of the individual Member States published by European Commission at the beginning of 2010, potential countries have been identified that might be worth considering for a cooperation. Concrete discussions have already been held with several of these countries to probe into a possible cooperation in achieving Luxembourg's targets and if applicable, to prepare.

- (b) **Describe the means by which private entities can propose and take part in joint projects either with Member States or third countries.**

The analysis on the integration of private entities could not be completed yet. The first analyses have, however, shown that a combination of projects by private investors with a Member State is possibly most effective when coupled with a statistical transfer. Further talks and studies will have to show to what extent such constructions are realisable.

(c) Give the criteria for determining when statistical transfers or joint projects shall be used.

At first glance, feasibility appears to be an important criterion from Luxembourg's point of view when choosing one of these two cooperation instruments. For reasons of the European state aid as well as the applicable national and European invitations to tender, statistical transfers appear to be the easiest to implement with the least administrative effort and time requirements.

It must, however, be made clear here that Luxembourg, which as the only country expressly dependent on the cooperation mechanisms, must also take the views of the other cooperation countries into account.

(d) What is going to be the mechanism to involve other interested Member States in a joint project?

As already described above, from Luxembourg's point of view, the implementation of joint projects is always coupled to a statistical transfer and is only possible through negotiations with the involved Member States.

(e) Are you willing to participate in joint projects in other Member States? How much installed capacity / electricity or heat produced per year are you planning to support? How do you plan to provide support schemes for such projects?

Currently exchanges are in progress with other Member States to analyse the realisation of joint projects. The talks are, however, not yet concrete enough to be able to answer the other questions.

4.7.2. Estimated excess production of renewable energy compared to the indicative trajectory which could be transferred to other Member States

Please use Table 9 filling in the required information.

The time frame of ten years does not allow for exact forecasts so that it cannot be definitively ruled out that at the level of the interim targets, surpluses could be generated which Luxembourg then could offer, if applicable to other Member States.

4.7.3. Estimated potential for joint projects

(a) In which sectors can you offer renewable energy use development in your territory for the purpose of joint projects?

Because Luxembourg must fall back to other countries in order to meet its targets, the realisation of joint projects in its territory is not planned at the moment. For this reason, the other questions in this chapter (b to e) remain unanswered.

- (b) **Has the technology to be developed been specified? How much installed capacity / electricity or heat produced per year?**
- (c) **How will sites for joint projects be identified? (For example, can local and regional authorities or promoters recommend sites? Or can any project participate regardless its location?)**
- (d) **Are you aware of the potential for joint projects in other Member States or in third countries? (In which sector? How much capacity? What is the planned support? For which technologies?)**
- (e) **Do you have any preference to support certain technologies? If so, which?**

4.7.4. Estimated demand for renewable energy to be satisfied by means other than domestic production

Please use Table 9 filling in the required information.

Table 9: Estimated excess and/or deficit production of renewable energy compared to the indicative trajectory which could be transferred to/from other Member States in Luxembourg (ktoe)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Estimated excess in forecast document											
Estimated excess in NREAP	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Estimated deficit in forecast document	Luxembourg estimates the amount of renewable energies which must be obtained from non-domestic production at 43 ktROE - 301 ktROE (0.5 TWh - 3.5 TWh)										
Estimated deficit in NREAP	0.0	44.8	22.8	37.8	9.8	45.0	21.6	74.5	39.2	66.1	92.9

5. Assessments

5.1. Total contribution expected of each renewable energy technology to meet the binding 2020 targets and the indicative interim trajectory for the shares of energy from renewable resources in electricity, heating and cooling and transport

The contribution of each renewable energy technology to the trajectory and 2020 targets in the electricity, heating and cooling and transport sectors should be estimated giving a possible future scenario without necessarily establishing any technology target or obligation.

For the electricity sector, both the expected (accumulated) installed capacity (in MW) and yearly production (GWh) should be indicated by technology. For hydro, a distinction should be made between plants of less than 1 MW, between 1 and 10 MW, and over 10 MW installed capacity. For solar power, details should be given separately for contributions from photovoltaic solar and concentrated solar power. Wind energy data should be indicated for onshore and offshore separately. For biomass, a distinction should be made between solid, gaseous and liquid biomass for electricity.

When assessing the heating and cooling sector, estimates of both installed capacity and production should be given for geothermal, solar, heat pumps and biomass technologies, with a breakdown for the latter category for solid, gaseous and liquid biomass. The contribution from district heating plants using renewable energy sources should be estimated.

The contribution from different technologies to the renewable energy target in the transport sector should be indicated for ordinary biofuels (both bioethanol and biodiesel), biofuels from wastes and residues, biofuels from non-food cellulosic material or from ligno-cellulosic material, biogas, electricity from renewable energy sources and hydrogen from renewable energy origin. In case you have estimations on developing the use of certain technologies by regions, could you please indicate that after the table?

Table 10.a: Estimation of total contribution (installed capacity, gross electricity generation) expected from each renewable energy technology in Luxembourg to meet the binding 2020 targets and the indicative interim trajectory for the shares of energy from renewable resources in electricity 2010-2014

	2005		2010		2011		2012		2013		2014	
	MW	GWh	MW	GWh	MW	GWh	MW	GWh	MW	GWh	MW	GWh
Hydro:	34	98.1	38	107	38	107	38	107	38	107	38	107
• 1MW	2	4.8	2	6	2	6	2	6	2	6	2	6
1MW-10 MW	32	93.3	36	100	36	100	36	100	36	100	36	100
• 10MW	0	0	0	0	0	0	0	0	0	0	0	0
Of which pumping	1100	784.5	1100	785	1100	785	1,100	785	1,300	928	1,300	928
Geothermal	0	0.0	0	0	0	0	0	0	0	0	0	0
Solar:	24	17.7	27	20	27	20	39	29	45	34	66	49
photovoltaic	24	17.7	27	20	27	20	39	29	45	34	66	49
concentrated solar power	0	0	0	0	0	0	0	0	0	0	0	0
Tide, wave, ocean	0	0	0	0	0	0	0	0	0	0	0	0
Wind:	35	52.4	35	60	40	71	54	98	71	130	89	163
onshore	35	52.4	35	60	40	71	54	98	71	130	89	163
offshore	0	0.0	0	0	0	0	0	0	0	0	0	0

<i>Biomass:</i>	9	46.1	13	70	15	84	20	112	25	142	30	172
<i>solid</i>	4	18.9	5	25	6	36	8	45	9	54	11	64
<i>biogas</i>	5	27.2	8	44	9	49	12	67	16	88	20	108
<i>Bioliquids³³</i>			0	0	0	0	0	0	0	0	0	0
TOTAL	102	214.3	113	256	120	281	151	346	179	413	223	491
<i>of which in CHP</i>	5	27.2	12	65	14	76	18	103	23	132	28	160

33 Take into account only those complying with the sustainability criteria, cf. Article 5(1) of Directive 2009/28/EC last subparagraph.

Table 10.b: Estimation of total contribution (installed capacity, gross electricity generation) expected from each renewable energy technology in Luxembourg to meet the binding 2020 targets and the indicative interim trajectory for the shares of energy from renewable resources in electricity 2015-2020

	2015		2016		2017		2018		2019		2020	
	MW	GWh	MW	GWh	MW	GW7i	MW	GWh	MW	GWh	MW	GWh
Hydro:	38	107	38	107	38	107	40	113	42	119	44	124
• 1MW	2	6	2	6	2	6	2	7	2	7	3	7
1MW-10 MW	36	100	36	100	36	100	38	107	40	112	41	117
• 10MW	0	0	0	0	0	0	0	0	0	0	0	0
Of which pumping	1300	928	1,300	928	1,300	928	1,300	928	1,300	928	1,300	928
Geothermal	0	0	0	0	0	0	0	0	0	0	0	0
Solar:	88	65	100	74	106	79	110	81	112	83	113	84
Photovoltaic	88	65	100	74	106	79	110	81	112	83	113	84
Concentrated solar power	0	0	0	0	0	0	0	0	0	0	0	0
Tide, wave, ocean	0	0	0	0	0	0	0	0	0	0	0	0
Wind:	105	192	117	213	124	226	128	234	130	238	131	239
Onshore	105	192	117	213	124	226	128	234	130	238	131	239
Offshore	0	0	0	0	0	0	0	0	0	0	0	0

Biomass:	36	200	42	229	47	259	53	293	56	314	59	334
solid	13	77	16	95	19	119	24	150	27	171	30	190
<i>biogas</i>	23	123	26	133	28	139	29	143	29	143	29	144
<i>bioliquids</i> ³⁴	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	267	564	296	622	316	670	331	722	340	754	347	780
<i>of which in CHP</i>	34	188	39	215	44	244	50	277	53	299	56	318

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See footnote 24.

Table 11: Estimation of total contribution (final energy consumption³⁵) expected from each renewable energy technology in Luxembourg to meet the binding 2020 targets and the indicative interim trajectory for the shares of energy from renewable resources in heating and cooling 2010-2020 (ktoe)

	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Geothermal (excluding low temperature geothermal heat in heat pump applications)	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Solar	0.2	0.7	0.9	1.1	1.2	1.4	2.4	3.5	4.5	5.5	6.7
Biomass:	19.2	23.4	25.3	30.4	38.3	44.2	50.3	56.5	63.0	70.1	76.4
<i>solid</i>	16.0	18.8	20.3	24.0	30.0	34.1	38.7	44.0	50.0	56.8	63.1
<i>biogas</i>	3.2	4.6	4.9	6.5	8.4	10.2	11.6	12.5	13.0	13.3	13.4
<i>Bioliquids</i> ³⁶	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Renewable energy from heat pumps:	0.2	1.4	1.7	2.1	2.4	2.8	4.2	5.7	7.6	10.0	13.1
- of which aerothermal	-	-	-	-	-	-	-	-	-	-	-
- of which geothermal	-	-	-	-	-	-	-	-	-	-	-
- of which hydrothermal	-	-	-	-	-	-	-	-	-	-	-
TOTAL	19.6	25.5	27.8	33.6	42.0	48.4	57.0	65.7	75.1	85.7	96.2
<i>Of which DH</i> ³⁷	3.0	4.7	5.7	10.0	16.8	21.5	26.1	30.7	35.2	40.2	44.0
<i>Of which biomass in Households</i> ³⁸	16.0	18.8	19.5	20.5	21.5	22.7	24.2	25.9	27.8	30.0	32.4

35 Direct use and district heat as defined in Article 5.4 of Directive 2009/28/EC.

36 Take into account only those complying with the sustainability criteria, cf. Article 5(1) last subparagraph of Directive 2009/28/EC

37 District heating and / or cooling from total renewable heating and cooling consumption. (RES- DH).

38 From the total renewable heating and cooling consumption.

Table 12: Estimation of total contribution expected from each renewable energy technology in Luxembourg to meet the binding 2020 targets and the indicative interim trajectory for the shares of energy from renewable resources in the transport sector 2010-2020 (ktoe)³⁹

	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Bioethanol/ bio-ETBE	0.0	4.7 ⁴⁰	2.7	4.0	5.5	7.2	8.8	10.0	12.3	14.7	18.9	23.1
<i>Of which Biofuels⁴¹ Article 21.2⁴²</i>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<i>f which imported⁴³</i>	0.0	4.7	2.7	4.0	5.5	7.2	8.8	10.0	12.3	14.7	18.9	23.1
Biodiesel	1.0	36.8 ⁴⁴	21.5	31.7	44.0	58.2	71.8	81.9	101.7	121.9	157.0	192.7
<i>Of which Biofuels⁴⁵ Article 21.2⁴⁶</i>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<i>Of which imported⁴⁷</i>	1.0	36.8	21.5	31.7	44.0	58.2	71.8	81.9	101.7	121.9	157.0	192.7
Hydrogen from renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Renewable electricity	1.1	1.9	2.2	2.5	2.8	3.3	3.7	4.9	6.1	7.5	8.9	10.4
<i>Of which road transport</i>	0.0	0.0	0.1	0.1	0.2	0.3	0.4	1.2	2.0	3.0	4.0	5.1
<i>Of which non-road transport</i>	1.1	1.9	2.1	2.4	2.6	3.0	3.4	3.7	4.1	4.5	4.9	5.3
Others (as biogas, vegetable oils, etc.) – please specify	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<i>Of which Biofuels⁴⁸ Article 21.2</i>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL	2.1	43.4	26.4	38.1	52.3	68.6	84.3	96.7	120.2	144.1	184.8	226.1

³⁹ 5(1) last subparagraph.

⁴⁰ For the biofuels in 2010, the compliance with sustainability criteria was not required.

⁴¹ Biofuels that are included in Article 21(2) of Directive 2009/28/EC.

⁴² Currently a forecast of the available amount of biofuels according to Article 21(2) of Directive 2009/28/EC is not possible.

⁴³ From the whole amount of bioethanol / bio-ETBE.

⁴⁴ For the biofuels in 2010, the compliance with sustainability criteria was not required.

⁴⁵ Biofuels that are included in Article 21(2) of Directive 2009/28/EC.

⁴⁶ Currently a forecast of the available amount of biofuels according to Article 21(2) of Directive 2009/28/EC is not possible.

⁴⁷ From the whole amount of biodiesel.

⁴⁸ Biofuels that are included in Article 21(2) of Directive 2009/28/EC.

5.2. Total contribution expected from energy efficiency and energy saving measures to meet the binding 2020 targets and the indicative interim trajectory for the shares of energy from renewable resources in electricity, heating and cooling and transport.

The answer to this requirement should be included in table 1 under chapter 1.

5.3. Assessment of the impacts (Optional)

Table 13: Estimated costs and benefits of the renewable energy policy support measures:

Measure package	Expected renewable cumulated 2011 until 2020 for new RE plants (2011 to 2020)	Expected cost (in EUR) – indicate time frame cumulated 2011 until 2020 for new RE plants (2011 to (2020)	Expected GHG reduction by gas \ (t/year) cumulated 2011 until 2020 for new RE plants (2011 to (2020)	Expected job creation in 2020 through new RE plants (2011 to 2020)
RE electricity	269.8	231 ⁴⁹	0 ⁵⁰	1500 - 1600
RE heating	410.6	178	1,029	
RE transport / biofuels	822.8	143	1,364	
RE transport E-mobility ⁵¹	16.2	81	407 ⁵²	

5.4. Preparation of the National Renewable Energy Action Plan and the follow-up of its implementation

(a) How were regional and/or local authorities and/or cities involved in the preparation of this Action Plan? Were other stakeholders involved?

For the purposes of broad involvement of all actors who are involved in the implementation of Directive 2009/28/EC whether directly or indirectly, the Ministry of Economic Affairs and Foreign trade organised a workshop on 19th April 2010.

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- 49 The costs expected for KWK were charged according to the generation balance of the RE electricity on the one hand and the RE heating on the other.
- 50 Through the territorial principle used by Luxembourg in the calculation of the CO₂ emissions, the emissions reduction due to RE electricity is set at 0. In the European balance, this, however, leads to a reduction of the GHG emissions of 1,302 kt CO₂.
- 51 The estimates included here are only for road traffic.
- 52 Through the territorial principle used by Luxembourg in the calculation of the CO₂ emissions, the emissions reduction due to E mobility corresponds to fuel reduction (diesel and petrol) in Luxembourg that is 407 kt CO₂. Due to the increased use of electricity by the E mobility, this, however leads in the European balance to a net reduction of the GHG emissions of 149 kt CO₂.

Approximately 100 invitations were sent to institutions and around 50 institutions and 100 people took part in the workshop itself. During this workshop, the basics of Directive 2009/28/EC, several variations for the achievement of the targets as well as the economic opportunities in the area of renewable energies were introduced and discussed at the national level. The corresponding detailed documents were sent to the participants about a week in advance. Comments were accepted for approximately 3 weeks after the workshop by the responsible ministries and were analysed when preparing the plans and in part, taken into consideration.

- (b) Are there plans to develop regional/local renewable energy strategies? If so, could you please explain? In case relevant competences are delegated to regional/local levels, what mechanism will ensure national target compliance?**

Due to the size of Luxembourg, it is possible to implement the national Action Plan for renewable energies at the national level and integrate the local actors and decision-makers efficiently.

A small number of communities have policies for the development of renewable energies which were prepared outside of the framework of Directive 2009/28/EC. These local efforts could, to a certain extent, also contribute to the achievement of the national targets. Accordingly, the local authorities have a certain autonomy which makes it possible for them with regard to public infrastructures or within the framework of the implementation of other building projects, to emphasise the use renewable energies. They are also supported in these approaches through the financial mechanisms mentioned in the plan.

Additionally the governmental programme provides for within the framework of its measures in the area of climate protection, concluding a so-called climate pact with the communities in which questions on the use of renewable energies are to be agreed upon.

- (c) Please explain the public consultation carried out for the preparation of this Action Plan.**

The corresponding information is already in the answers under Point (a) of this chapter.

- (d) Please indicate your national contact point / the national authority or body responsible for the follow-up of the Renewable Energy Action Plan?**

The Ministry for Economic Affairs and Foreign Trade will take over the follow-up of the Action Plan together with the public actors involved.

- (e) Do you have a monitoring system, including indicators for individual measures and instruments, to follow-up the implementation of the Renewable Energy Action Plan? If so, could you please give more details on it?**

An annual monitoring of the Action Plan for renewable energies and the essential policy issues contained in it is planned.