Republic of Latvia

Cabinet

Regulation No. 42

Adopted 23 January 2018

**Methodology for Calculating Greenhouse Gas Emissions**

*Issued pursuant to*

*Section 53, Paragraph two, Clause 2 of the law On Pollution*

**I. General Provisions**

1. This Regulation prescribes the methodology for the performance of unified calculation of greenhouse gas (hereinafter – GHG) emissions (hereinafter – the methodology) in order to assess the impact of measures and projects on climate change.

2. The following terms are used in this Regulation:

2.1. measure ‒ a new operation or a change in operation as a result of which changes in the amount of GHG emissions are possible;

2.2. measure data ‒ data necessary for the calculation of the amount of GHG emissions;

2.3. project ‒ a set of operations comprised of one or several measures;

2.4. amount of GHG emissions ‒ the amount of GHG emissions expressed in tonnes of carbon dioxide equivalent (hereinafter ‒ t CO2equiv.);

2.5. changes in the amount of GHG emissions – the difference between the amount of GHG emissions prior to the implementation of the measure and the amount of GHG emissions after implementation of the measure the numeric value whereof is either a positive (GHG emission reduction) or negative (GHG emission increase) number.

3. The methodology is applied to assess the impact of such planned or implemented measures on climate change whereby it is intended to attain one or several of the following objectives or tasks:

3.1. to improve energy efficiency;

3.2. to introduce renewable energy technologies or to improve the efficiency of fossil energy technologies;

3.3. to improve the efficiency of cooling equipment;

3.4. to implement measures in the field of transport (except for the measures referred to in Sub-paragraph 3.2 of this Regulation);

3.5. to implement measures in the field of waste management (except for the measures referred to in Sub-paragraph 3.2 of this Regulation).

4. The methodology shall be applied in the cases provided for in the legal acts of the Republic of Latvia or in cases where a natural or legal person wishes to assess the impact of measures and projects on climate change.

5. The methodology shall not be applied to the monitoring of the quantity of emissions of an operator or aircraft operator referred to in Section 45, Paragraph one of the law On Pollution and the monitoring, control of GHG emissions and reporting thereon referred to in Section 53, Paragraph one of the law On Pollution.

6. The amount of GHG emissions shall be calculated for the amounts of carbon dioxide (hereinafter ‒ CO2), methane (hereinafter ‒ CH4), nitrous oxide (hereinafter ‒ N2O), and fluorinated greenhouse gas (hereinafter ‒ F-gas) emissions expressed as t CO2 equiv., using GHG emissions factors and the values of global-warming potential included in Annex 1 to this Regulation.

7. The amount of project GHG emissions shall be calculated by summing up the changes in the amount of GHG emissions of the measures included therein.

8. In order to calculate the amount of GHG emissions prior to and after implementation of the measure, the measure data shall be used. If prior to or after implementation of the measure different types of energy resources or power sources are used, the calculation of the amount of GHG emissions shall be performed for each type of energy resource or power source separately.

9. The calculation of changes in the amount of GHG emissions shall performed as the difference between the amount of GHG emissions prior to implementation of the measure and the amount of GHG emissions after implementation of the measure, using the following formula:

|  |  |
| --- | --- |
|  | , where |

 ‒ changes in the amount of GHG emissions, t CO2 equiv./year;

 ‒ changes in the amount of GHG emissions prior to implementation of the measure, t CO2 equiv./year;

 ‒ changes in the amount of GHG emissions after implementation of the measure, t CO2 equiv./year.

10. If it is necessary to calculate changes in the amount of GHG emissions for a measure which is not provided for in this Regulation, the calculation shall be performed by using the formula referred to in Paragraph 9 of this Regulation, and a detailed, justified and clearly traceable calculation process shall be attached to the results of the calculation.

11. The calculation of changes in the amount of GHG emissions for measures and projects in the field of agriculture shall be performed by using a detailed method in accordance with Regulation (EU) No 525/2013 of the European Parliament and of the Council of 21 May 2013 on a mechanism for monitoring and reporting greenhouse gas emissions and for reporting other information at national and Union level relevant to climate change and repealing Decision No 280/2004/EC in conformity with the electronic tool developed by the institution whose competence in the calculations of GHG emissions in the field of agriculture has been specified in the laws and regulations regarding GHG inventories and projections. The Ministry of Agriculture shall ensure the conformity of calculation formulae included in the electronic tool with the conditions of the abovementioned Regulation and, where necessary, updating of the electronic tool.

12. In order to ensure the calculation of the amount of GHG emissions for the measures referred to in this Regulation:

12.1. each operator of the district heating system and each operator of the local heating system shall calculate each year CO2 emission factor for thermal energy referred to in Paragraph 2 of Annex 1 to this Regulation and by 31 January of the current year shall publish its value on the website or submit a statement regarding its value upon request of a thermal energy user;

12.2. each year the Ministry of Environmental Protection and Regional Development, on the basis of the data at the disposal of the Central Statistical Bureau, shall calculate the emission factors referred to in Paragraphs 3 and 4 of Annex 1 to this Regulation and shall publish them on its website by 31 January of the current year.

**II. Methodology for Energy Efficiency Improvement Measures**

13. The methodology shall be applied to measures impacting thermal energy and electricity consumption in buildings or structural elements, technological installations for manufacturing, as well as traffic, energy industry, water supply, sewerage and communications infrastructure.

14. The amount of GHG emissions for measures impacting thermal energy consumption in buildings or structural elements shall be calculated, using the following formulae:

14.1. if thermal energy is ensured by the operator of the district heating system:

|  |  |
| --- | --- |
|  | , where |

 ‒ the amount of GHG emissions, t CO2 equiv./year;

 ‒ the amount of thermal energy used in buildings or structural elements, MWh/year;

 ‒ CO2 emission factor for thermal energy in accordance with Paragraph 1 of Annex 1 to this Regulation, t CO2/MWh;

14.2. if thermal energy is ensured by the operator of the local heating system or the user of an individual heating system:

|  |  |
| --- | --- |
|  | , where |

 ‒ the amount of GHG emissions, t CO2 equiv./year;

 ‒ the amount of thermal energy produced which is necessary for ensuring hot water and heating in buildings and structural elements, MWh/year;

 ‒ the efficiency of the combustion unit;

 ‒ CO2 emission factor for thermal energy in accordance with Paragraph 1 of Annex 1 to this Regulation, t CO2/MWh;

 ‒ the amount of electricity necessary for operating performance of the technology using energy resources (self-consumption), MWh;

 ‒ CO2 emission factor for electricity in accordance with Paragraph 1 of Annex 1 to this Regulation ( or ), t CO2/MWh;

14.3. if a comprehensive assessment of the amount of GHG emissions on the scale of Latvia is necessary:

|  |  |
| --- | --- |
|  | , where |

 ‒ the amount of GHG emissions, t CO2 equiv./year;

 ‒ the amount of thermal energy used in buildings, MWh/year;

 ‒ CO2 emission factor for thermal energy produced in Latvia in accordance with Paragraph 1 of Annex 1 to this Regulation, t CO2/MWh;

14.4. if thermal energy is ensured by using electricity:

|  |  |
| --- | --- |
|  | , where |

 ‒ the amount of GHG emissions, t CO2 equiv./year;

 ‒ the amount of electricity used which is required for ensuring thermal energy in buildings and structural elements, MWh/year;

 ‒ CO2 emission factor for electricity in accordance with Paragraph 1 of Annex 1 to this Regulation ( or ), t CO2/MWh.

15. If the amount of thermal energy produced cannot be determined by using thermal energy measurement devices, the following formula shall be used:

|  |  |
| --- | --- |
|  | , where |

 ‒ the amount of thermal energy produced, MWh/year;

 ‒ fuel consumption, kg/s or m3/s;

 ‒ lower heating value for the reaction mass of fuel in accordance with Paragraph 1 of Annex 1 and Paragraph 3 of Annex 2 to this Regulation, MJ/kg or MJ/m3;

 ‒ the efficiency of the combustion unit;

 ‒ duration of the operation of the combustion unit per year, h/year.

16. The amount of GHG emissions for measures impacting electricity or thermal energy consumption in traffic, energy industry, water supply, sewerage and communications infrastructure shall be calculated, using the following formula:

|  |  |
| --- | --- |
|  | , where |

 ‒ the amount of GHG emissions, t CO2 equiv./year;

 ‒ the amount of electricity or thermal energy required in traffic, energy industry, water supply, sewerage and communications infrastructure, MWh/year;

 ‒ CO2 emission factor in accordance with Paragraph 1 of Annex 1 to this Regulation, t CO2/MWh.

17. The amount of GHG emissions for measures impacting electricity or thermal energy consumption in technological installations for manufacturing shall be calculated, using the following formula:

|  |  |
| --- | --- |
|  | , where |

 ‒ the amount of GHG emissions, t CO2 equiv./year;

 ‒ the amount of electricity or thermal energy used by technological installations for manufacturing, MWh/year;

 ‒ CO2 emission factor in accordance with Paragraph 1 of Annex 1 to this Regulation, t CO2/MWh.

18. If it is necessary to compare changes in the amount of GHG emissions for measures impacting electricity or thermal energy consumption in technological installations for manufacturing, taking into account the amount of the manufactured products, the following formula shall be used:

|  |  |
| --- | --- |
|  | , where |

 ‒ changes in the amount of GHG emissions, t CO2 equiv./year;

 ‒ thermal energy consumption prior to implementation of the measure, MWh/year;

 ‒ electricity consumption prior to implementation of the measure, MWh/year;

 ‒ thermal energy consumption after implementation of the measure, MWh/year;

 ‒ electricity consumption after implementation of the measure, MWh/year;

 ‒ the amount of manufactured products prior to implementation of the measure, t/year, m3/year or units/year;

 ‒ the amount of manufactured products after implementation of the measure, t/year, m3/year or units/year;

 ‒ CO2 emission factor in accordance with Paragraph 1 of Annex 1 to this Regulation, t CO2/MWh.

19. The formula referred to in Paragraph 9 of this Regulation shall be used to calculate changes in the amount of GHG emissions for the measures referred to in Paragraphs 14, 16, and 17 of this Regulation.

20. If the implemented energy efficiency measures increase or reduce energy consumption of another energy system, the calculation of GHG emissions shall be performed also for energy consumption of the impacted energy system.

21. If the project includes both a measure for the improvement of energy efficiency and a measure for the change of a fossil energy technology with a renewable energy technology or for efficiency improvement, changes in the amount of GHG emissions shall be calculated, using the formula referred to in Paragraph 9 of this Regulation and the conditions referred to in Chapter III of this Regulation.

**III. Methodology for the Measures of Introduction of Renewable Energy Technologies and Improvement of the Efficiency of Fossil Energy Technologies**

22. The methodology shall be applied to the following measures of introduction of renewable energy technologies and improvement of the efficiency of fossil energy technologies:

22.1. replacement of a fossil energy technology with renewable energy technologies;

22.2. partial replacement of a fossil energy technology with renewable energy technologies;

22.3. complete or partial replacement of a fossil energy technology with fossil energy technologies by changing or without changing the type of fossil energy resources used;

22.4. complete or partial replacement of thermal energy produced by using fossil or renewable energy technologies with thermal energy from the district heating system;

22.5. complete or partial replacement of thermal energy from the district heating system with thermal energy produced by fossil or renewable energy technologies;

22.6. complete or partial replacement of electricity from the electricity grid with electricity produced by fossil or renewable energy technologies;

22.7. transfer of electricity produced in the course of introduction of new technologies for the production of electricity to the electricity grid.

23. The amount of GHG emissions prior to the implementation of the measure shall be calculated for measures referred to in Sub-paragraphs 22.1, 22.2, and 22.4 of this Regulation, using the following formula:

|  |  |
| --- | --- |
|  | , where |

 ‒ changes in the amount of GHG emissions prior to implementation of the measure, t CO2 equiv./year;

 ‒ the amount of thermal energy or electricity produced prior to implementation of the measure, MWh/year;

 ‒ the efficiency of the combustion unit;

 ‒ CO2 emission factor for the type of fuel used in accordance with Paragraph 1 of Annex 1 to this Regulation, t CO2/MWh;

 ‒ the amount of electricity necessary for operating performance of the technology using energy resources prior to implementation of the measure (self-consumption), MWh/year;

 ‒ CO2 emission factor for electricity in accordance with Paragraph 1 of Annex 1 to this Regulation ( or ), t CO2/MWh.

24. The amount of GHG emissions prior to implementation of the measure shall be calculated for the measures referred to in Sub-paragraph 22.5 of this Regulation, using the following formula:

|  |  |
| --- | --- |
|  | , where |

 ‒ changes in the amount of GHG emissions prior to implementation of the measure, t CO2 equiv./year;

 ‒ the amount of thermal energy used prior to implementation of the measure, MWh/year;

 ‒ CO2 emission factor for thermal energy produced in Latvia in accordance with Paragraph 1 of Annex 1 to this Regulation, t CO2/MWh.

25. The amount of GHG emissions after implementation of the measure shall be calculated for the measures referred to in Sub-paragraph 22.1 of this Regulation, using the following formula:

|  |  |
| --- | --- |
|  | , where |

 ‒ changes in the amount of GHG emissions after implementation of the measure, t CO2 equiv./year;

 ‒ the amount of electricity required for operating performance of renewable energy technologies (self-consumption) after implementation of the measure, MWh/year;

 ‒ CO2 emission factor for electricity in accordance with Paragraph 1 of Annex 1 to this Regulation ( or ), t CO2/MWh.

26. The amount of GHG emissions after implementation of the measure shall be calculated for the measures referred to in Sub-paragraph 22.2 of this Regulation, using the following formula:

|  |  |
| --- | --- |
|  | , where |

 ‒ changes in the amount of GHG emissions after implementation of the measure, t CO2 equiv./year;

 ‒ the amount of thermal energy or electricity produced by using fossil energy technologies after implementation of the measure, MWh/year;

 ‒ the efficiency of the combustion unit;

 ‒ CO2 emission factor for the type of fossil fuel used in accordance with Paragraph 1 of Annex 1 to this Regulation, t CO2/MWh;

 ‒ the amount of electricity necessary for operating performance of technologies using fossil energy resources (self-consumption) after implementation of the measure, MWh/year;

 ‒ the amount of electricity necessary for operating performance of renewable energy technologies (self-consumption) after implementation of the measure, MWh/year;

 ‒ CO2 emission factor for electricity in accordance with Paragraph 1 of Annex 1 to this Regulation ( or ), t CO2/MWh.

27. The amount of GHG emissions after implementation of the measure shall be calculated for the measures referred to in Sub-paragraph 22.4 of this Regulation, using the following formula:

|  |  |
| --- | --- |
|  | , where |

 ‒ changes in the amount of GHG emissions after implementation of the measure, t CO2 equiv./year;

 ‒ the amount of thermal energy used after implementation of the measure, MWh/year;

 ‒ CO2 emission factor for thermal energy in accordance with Paragraph 1 of Annex 1 to this Regulation, t CO2/MWh.

28. The amount of GHG emissions after implementation of the measure shall be calculated for the measures referred to in Sub-paragraph 22.5 of this Regulation, using the following formula:

|  |  |
| --- | --- |
|  | , where |

 ‒ changes in the amount of GHG emissions after implementation of the measure, t CO2 equiv./year;

 ‒ the amount of thermal energy produced after implementation of the measure, MWh/year;

 ‒ the efficiency of the combustion unit;

 ‒ CO2 emission factor for the type of fuel used in accordance with Paragraph 1 of Annex 1 to this Regulation, t CO2/MWh;

 ‒ the amount of electricity necessary for operating performance of technologies using energy resources (self-consumption) after implementation of the measure, MWh/year;

 ‒ CO2 emission factor for electricity in accordance with Paragraph 1 of Annex 1 to this Regulation ( or ), t CO2/MWh.

29. The amount of GHG emissions for the measures referred to in Sub-paragraph 22.3 of this Regulation shall be calculated, using the following formula:

|  |  |
| --- | --- |
|  | , where |

 ‒ the amount of GHG emissions, t CO2 equiv./year;

 ‒ the amount of thermal energy or electricity produced by using fossil energy technologies, MWh/year;

 ‒ the efficiency of the combustion unit;

 ‒ CO2 emission factor for the type of fossil fuel used in accordance with Paragraph 1 of Annex 1 to this Regulation, t CO2/MWh;

 ‒ the amount of electricity necessary for operating performance of fossil energy technologies (self-consumption), MWh;

 ‒ CO2 emission factor for electricity in accordance with Paragraph 1 of Annex 1 to this Regulation ( or ), t CO2/MWh.

30. Changes in the amount of GHG emissions for the measure referred to in Sub-paragraph 22.6 of this Regulation shall be calculated, using the following formula:

|  |  |
| --- | --- |
|  | , where |

 ‒ changes in the amount of GHG emissions, t CO2 equiv./year;

 ‒ the amount of electricity produced by using fossil or renewable energy technologies which completely or partially replaces electricity from the electricity grid, MWh/year;

 ‒ CO2 emission factor for electricity in accordance with Paragraph 1 of Annex 1 to this Regulation, t CO2/MWh.

31. Changes in the amount of GHG emissions for the measure referred to in Sub-paragraph 22.7 of this Regulation shall be calculated, using the following formula:

|  |  |
| --- | --- |
|  | , where |

 ‒ changes in the amount of GHG emissions, t CO2 equiv./year;

 ‒ the amount of electricity produced by using renewable energy technologies for transfer to the electricity grid, MWh/year;

 ‒ CO2 emission factor for electricity in accordance with Paragraph 1 of Annex 1 to this Regulation, t CO2/MWh;

 ‒ CO2 emission factor for electricity transmission in the electricity grid in accordance with Paragraph 1 of Annex 1 to this Regulation, t CO2/MWh.

32. If the amount of thermal energy produced cannot be determined with measurement devices, it shall be calculated, using the following formula:

|  |  |
| --- | --- |
|  | , where |

 ‒ the amount of thermal energy produced, MWh/year;

 ‒ fuel consumption, kg/s or m3/s;

 ‒ lower heating value for the reaction mass of fuel in accordance with Paragraph 1 of Annex 1 and Paragraph 3 of Annex 2 to this Regulation, MJ/kg or MJ/m3;

 ‒ the efficiency of the combustion unit;

 ‒ duration of the operation of the combustion unit per year, h/year.

33. If within the scope of a measure it is intended to install a cogeneration plant, the amount of GHG emissions shall be calculated in accordance with the cases referred to in Paragraph 22 of this Regulation, using the following formula:

|  |  |
| --- | --- |
|  | , where |

 ‒ the amount of GHG emissions, t CO2 equiv./year;

 ‒ the amount of GHG emissions for the amount of thermal energy produced in a cogeneration plant in accordance with Paragraph 23, 24, 25, 26, 27, 28, 29, or 32 of this Regulation, t CO2 equiv./year;

 ‒ the amount of GHG emissions for the amount of electricity produced in a cogeneration plant in accordance with Paragraph 23, 25, 26, 29, 30, or 31 of this Regulation, t CO2 equiv./year.

34. Changes in the amount of GHG emissions shall be calculated for each measure referred to in Paragraph 22 of this Regulation separately, without summing them up.

**IV. Methodology for Efficiency Improvement Measures of Cooling Equipment**

35. The methodology shall be applied to the measures of improvement or modernisation of F-gas containing cooling equipment efficiency (including the change of F-gas type).

36. The amount of GHG emissions for the measures referred to in Paragraph 35 of this Regulation shall be calculated, using the following formula:

|  |  |
| --- | --- |
|  | , where |

 ‒ the amount of GHG emissions, t CO2 equiv./year;

 ‒ quantity of F-gases supplemented over a period of one year in the equipment, t/year;

 ‒ global-warming potential depending on F-gas used in accordance with Paragraph 9 of Annex 1 to this Regulation, t CO2 equiv./t F-gas.

37. The formula referred to in Paragraph 9 of this Regulation shall be used for the calculation of changes in the amount of GHG emissions for the measure referred to in Paragraph 35 of this Regulation.

**V. Methodology for Measures in the Field of Transport**

38. The methodology shall be applied to the measures in the field of transport which provide for the replacement and modernisation of the means of transport, the transition from the use of motor vehicles to the use of public transport and cycling transport, the construction of bicycle routes, and the improvement of transport logistics.

39. The amount of GHG emissions prior to implementation of the measure for the means of transport which is operated with fuel of fossil origin shall be calculated, using the following formula:

|  |  |
| --- | --- |
|  | , where |

 ‒ changes in the amount of GHG emissions prior to implementation of the measure, t CO2 equiv./year;

 ‒ average weighted fuel consumption of the means of transport, l/km;

 ‒ average annual mileage of the means of transport since the initial registration thereof in Latvia, km/year;

 ‒ transfer of fuel consumption from litres to cubic metres;

 ‒ density of the fuel of fossil origin (for transfer of fuel consumption from volumetric to mass measurement unit) in accordance with Paragraph 5 of Annex 1 to this Regulation, t/m3;

 ‒ lowest combustion heat of the fuel of fossil origin in accordance with Paragraph 5 of Annex 1 to this Regulation, TJ/t;

 ‒ CO2 emission factor for the fuel of fossil origin in accordance with Paragraph 5 of Annex 1 to this Regulation, t CO2/TJ;

40. The amount of GHG emissions after implementation of the measure in relation to the replacement of the means of transport shall be calculated, using the following formulae:

40.1. if the means of transport operated with fossil energy resources is replaced with an electrical vehicle:

|  |  |
| --- | --- |
|  | , where |

 ‒ changes in the amount of GHG emissions after implementation of the measure, t CO2 equiv./year;

 ‒ electricity consumption of an electrical vehicle, kWh/km;

 ‒ estimated mileage of an electrical vehicle per year, km/year;

 ‒ CO2 emission factor for electricity in accordance with Paragraph 1 of Annex 1 to this Regulation ( or ), t CO2/MWh.

40.2. if the means of transport operated with fossil energy resources is replaced with a hydrogen vehicle:

|  |  |
| --- | --- |
|  | , where |

 ‒ changes in the amount of GHG emissions after implementation of the measure, t CO2 equiv./year;

 ‒ estimated mileage of a hydrogen vehicle per year, km/year;

 ‒ CO2 emission factor when using a hydrogen vehicle, kg CO2/km;

40.3. if the means of transport operated with fossil energy resources is replaced with a hybrid vehicle, the calculation formula according to the charging capacity of the hybrid vehicle technology shall be applied:

|  |  |
| --- | --- |
|  | , where |

 ‒ changes in the amount of GHG emissions after implementation of the measure, t CO2 equiv./year;

 ‒ average weighted fuel consumption of a hybrid vehicle, l/km;

 ‒ estimated mileage of a hybrid vehicle per year, km/year;

 ‒ transfer of fuel consumption from litres to cubic metres;

 ‒ density of the fuel of fossil origin (for transfer of fuel consumption from volumetric to mass measurement unit) in accordance with Paragraph 5 of Annex 1 to this Regulation, t/m3;

 ‒ lowest combustion heat of the fuel of fossil origin in accordance with Paragraph 5 of Annex 1 to this Regulation, TJ/t;

 ‒ CO2 emission factor for the used fuel of fossil origin in accordance with Paragraph 5 of Annex 1 to this Regulation, t CO2/TJ;

 ‒ electricity consumption of a hybrid vehicle, kWh/km;

 ‒ estimated mileage of a hybrid vehicle per year, km/year;

 ‒ CO2 emission factor for electricity in accordance with Paragraph 1 of Annex 1 to this Regulation ( or ), t CO2/MWh;

40.4. if the means of transport operated with fossil energy resources is replaced with the means of transport which is operated with biofuel obtained from renewable energy resources (including biogas, biodiesel, bioethanol):

|  |  |
| --- | --- |
|  | , where |

 ‒ changes in the amount of GHG emissions after implementation of the measure, t CO2 equiv./year;

40.5. if the means of transport operated with fossil energy resources is replaced with other means of transport operated with fossil energy resources by rebuilding or renewing and modernising the means of transport operated with fossil energy resources:

|  |  |
| --- | --- |
|  | , where |

 ‒ changes in the amount of GHG emissions after implementation of the measure, t CO2 equiv./year;

 ‒ average weighted fuel consumption of the means of transport, l/km;

 ‒ estimated mileage of the means of transport per year, km/year;

 ‒ transfer of fuel consumption from litres to cubic metres;

 ‒ density of the fuel of fossil origin (for transfer of fuel consumption from volumetric to mass measurement unit) in accordance with Paragraph 5 of Annex 1 to this Regulation, t/m3;

 ‒ lowest combustion heat of the fuel of fossil origin in accordance with Paragraph 5 of Annex 1 to this Regulation, TJ/t;

 ‒ CO2 emission factor for the used fuel of fossil origin in accordance with Paragraph 5 of Annex 1 to this Regulation, t CO2/TJ.

41. Changes in the amount of GHG emissions for transition from the use of a motor vehicle to the use of public transport and cycling transport shall be calculated, using the following formulae:

41.1. in the case of transition from the use of a motor vehicle to the use of public transport:

|  |  |
| --- | --- |
|  | , where |

 ‒ changes in the amount of GHG emissions, t CO2 equiv./year;

 ‒ CO2 emission factor by using a motor vehicle depending on the type of the fossil fuel used in accordance with Paragraph 6 of Annex 1 to this Regulation, kg CO2/km;

 ‒ CO2 emission factor by using public transport depending on the type of public transport used in accordance with Paragraph 6 of Annex 1 to this Regulation, kg CO2/km;

* ‒* total distance travelled with a motor vehicle per year that is to be replaced by using public transport, km/year;

41.2. in the case of transition from the use of a motor vehicle to the use of cycling transport:

|  |  |
| --- | --- |
|  | , where |

 ‒ changes in the amount of GHG emissions, t CO2 equiv./year;

 ‒ CO2 emissions factor by using a motor vehicle depending on the type of the fossil fuel used in accordance with Paragraph 6 of Annex 1 to this Regulation, kg CO2/km;

* ‒* total distance travelled with a motor vehicle per year that is to be replaced by using cycling transport, km/year.

42. Changes in the amount of GHG emissions if bicycle routes are constructed shall be calculated, using the following formula:

|  |  |
| --- | --- |
|  | , where |

 ‒ changes in the amount of GHG emissions, t CO2 equiv./year;

* ‒* length of the bicycle route, km;

 ‒ number of bicyclists using the bicycle route over a period of one year, bicyclists/year;

 ‒ CO2 emissions factor, using a motor vehicle, t CO2/km.

43. If within the scope of a project it is intended to implement the measures referred to in Paragraphs 41 and 42 of this Regulation at the same time, changes in the amount of GHG emissions shall be calculated for each measure separately, without summing them up.

44. Changes in the amount of GHG emissions for transport logistics measures (including the planning of an optimal route) shall be calculated, using the following formula:

|  |  |
| --- | --- |
|  | , where |

 ‒ changes in the amount of GHG emissions, t CO2 equiv./year;

 ‒ average weighted fuel consumption of the means of transport prior to implementation of the measure, l/km;

 ‒ average weighted fuel consumption of the means of transport after implementation of the measure, l/km;

 ‒ distance travelled with the means of transport prior to implementation of the measure, km;

 ‒ distance travelled with the means of transport after implementation of the measure, km;

 ‒ transfer of fuel consumption from litres to cubic metres;

 ‒ density of the fuel of fossil origin (for transfer of fuel consumption from volumetric to mass measurement unit) in accordance with Paragraph 5 of Annex 1 to this Regulation, t/m3;

 ‒ lowest combustion heat of the fuel of fossil origin in accordance with Paragraph 5 of Annex 1 to this Regulation, TJ/t;

 ‒ CO2 emission factor for the used fuel of fossil origin in accordance with Paragraph 5 of Annex 1 to this Regulation, t CO2/TJ.

**VI.** **Methodology for Measures in the Field of Waste Management**

45. The methodology shall be applied to measures in the field of waste management where it is planned to produce biogas from food waste, waste of milk processing establishments, slaughterhouse and bird processing waste, fallen leaves, cut grass, and agricultural residues (livestock manure) for their further combustion or use in the means of transport.

46. Changes in the amount of GHG emissions for the measures referred to in Paragraph 45 of this Regulation shall be calculated, using the following formula:

|  |  |
| --- | --- |
|  | , where |

 ‒ changes in the amount of GHG emissions, t CO2 equiv./year;

* ‒* the amount of naturally wet biodegradable waste per year, t/year;

* ‒* the content of dry matter in naturally wet biodegradable waste in accordance with Paragraph 7 of Annex 1 to this Regulation;

 ‒ organic matter content in the dry matter of biodegradable waste in accordance with Paragraph 7 of Annex 1 to this Regulation;

 ‒ potential for the formation of biogas per 1 t of dry organic matter in accordance with Paragraph 8 of Annex 1 to this Regulation, m3/t dry organic matter;

 ‒ the amount of recovered biogas for combustion and use in the means of public transport, m3/year;

* ‒* methane density, t/m3;

25*‒* CH4 global-warming potential, t CO2 equiv./t CH4.

**VII. Closing Provision**

47. This Regulation shall come into force on 1 June 2018.

Prime Minister, Acting for the Minister for Health Māris Kučinskis

Minister for Environmental Protection and Regional Development Kaspars Gerhards

**Annex 1**

Cabinet Regulation No. 42

23 January 2018

**Greenhouse Gas Emissions Factors**

1. Carbon dioxide (hereinafter ‒ CO2) emissions factors for the types of energy carriers and energy resources are specified in Table 1 of this Annex.

Table 1

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Energy carrier or energy source | | Lowest combustion heat1 , MJ/kg | CO2 emission factor , t CO2/MWh | |
| designation | value of the factor |
| Type of fuel2 | coal (anthracite) | 26.7 |  | 0.354 |
| brown coal (lignite) | 11.9 | 0.364 |
| diesel fuel (gas oil/diesel oil) | 43.0 | 0.267 |
| black fuel oil (heavy fuel oils) | 40.4 | 0.279 |
| liquefied petroleum gas | 47.3 | 0.227 |
| natural gas | 48.03 | 0.202 |
| wood4 | 15.6 | 0 |
| other fuels2 |  |  |
| Electricity from electricity grid | ‒ | ‒ |  | according to Paragraph 4 of this Annex |
| Thermal energy from a heating system (identifiable energy producer) | ‒ | ‒ |  | according to Paragraph 2 of this Annex |
| Thermal energy from a heating system | ‒ | ‒ |  | according to Paragraph 3 of this Annex |
| Energy from renewable resources5 | ‒ | ‒ |  | 0 |
| Electricity transmission in the electricity grid | ‒ | ‒ |  | 0.007 |

Notes.

1 If a more accurate lowest combustion heat value is known, it may be used in further calculations, indicating a precise source of information or acquisition method.

2 In accordance with Annex VI to Commission Regulation (EU) No 601/2012 of 21 June 2012 on the monitoring and reporting of greenhouse gas emissions pursuant to Directive 2003/87/EC of the European Parliament and of the Council.

3 Lowest combustion heat for natural gas, MJ/m3.

4 Detailed calculation coefficients are specified in Annex 2 to Cabinet Regulation No. 42 of 23 January 2018, Methodology for Calculating Greenhouse Gas Emissions (hereinafter – the Regulation).

5 Wind, sun, geothermal, wave, tidal, and water energy, as well as aerothermal energy (thermal energy accumulated in the air), geothermal energy (thermal energy located under the surface of the mainland), and hydrothermal energy (thermal energy located in surface waters), waste landfill site and sewage treatment plant gas and biogas, and biomass.

2. In the case referred to in Sub-paragraphs 14.1 and 14.2 of the Regulation CO2 emission factor for thermal energy shall be calculated by the operator of the district heating system, the operator of the local heating system, or the user of an individual heating system, using the following formula:

|  |  |
| --- | --- |
|  | , where |

 – CO2 emission factor for thermal energy which is calculated by the operator of the district heating system, the operator of the local heating system, or the user of an individual heating system, t CO2/MWh;

 ‒ the amount of thermal energy which has been produced over the last calendar year by the operator of the district heating system, the operator of the local heating system, or the user of an individual heating system, using fossil energy resources, MWh;

 ‒ CO2 emission factor for the type of fuel used in accordance with Paragraph 1 of this Annex, t CO2/MWh. If the operator of the district heating system, the operator of the local heating system, or the user of an individual heating system produces the entire energy by using renewable energy technologies or over the past calendar year has completely replaced fossil energy technologies with renewable energy technologies, CO2 emission factor for thermal energy () shall be 0;

 ‒ total amount of thermal energy produced by the operator of the district heating system, the operator of the local heating system, or the user of an individual heating system, MWh;

 ‒ one or several technologies using fossil energy resources.

3. CO2 emission factor for thermal energy produced in Latvia in boiler houses and cogeneration plants shall be calculated, using the following formula:

|  |  |
| --- | --- |
|  | , where |

 ‒ CO2 emission factor for thermal energy produced in Latvia in boiler houses and cogeneration plants, t CO2/MWh.

 ‒ the amount of thermal energy produced in Latvia in boiler houses and cogeneration plants, using fossil fuel, MWh;

 ‒ CO2 emission factor for the type of fuel used in accordance with Paragraph 1 of this Annex, t CO2/MWh;

 ‒ the amount of thermal energy produced in Latvia, MWh.

4. CO2 emission factor for electricity produced in Latvia shall be calculated, using the following formula:

|  |  |
| --- | --- |
|  | , where |

 ‒ CO2 emission factor for electricity produced in Latvia, t CO2/MWh.

 ‒ the amount of electricity produced in Latvia, using fossil fuel, MWh;

 ‒ CO2 emission factor for the type of fuel used in accordance with Paragraph 1 of this Annex, t CO2/MWh;

 ‒ the amount of electricity produced in Latvia, MWh.

5. Taking into account the means of transport and the type of fuel used, the fuel density, lowest combustion heat, and CO2 emission factor are specified in Table 2 of this Annex.

Table 2

|  |  |  |  |
| --- | --- | --- | --- |
| Fuel | Lowest combustion heat\* , TJ/t | CO2 emission factor , t CO2/TJ | Density , t/m3 |
| *Road transport* | | | |
| Diesel fuel | 0.0430 | 74.00 | 0.837 |
| Petroleum | 0.0443 | 71.18 | 0.741 |
| Liquefied petroleum gas (LPG) | 0.0473 | 63.10 | 0.533 |
| Compressed natural gas (CNG) | 0.0480 | 56.1 | 0.197 |
| Liquefied natural gas (LNG) | 0.0480 | 56.1 | 0.455 |
| *Railway* | | | |
| Diesel fuel | 0.0430 | 74.00 | 0.837 |
| *Maritime transport* | | | |
| Diesel fuel | 0.0430 | 74.00 | 0.837 |
| Petroleum | 0.0443 | 69.30 | 0.741 |
| *Off-road transport* | | | |
| Diesel fuel | 0.0430 | 74.10 | 0.837 |
| Petroleum | 0.0443 | 69.30 | 0.741 |

Note. \* In accordance with Annex VI to Commission Regulation (EU) No 601/2012 of 21 June 2012 on the monitoring and reporting of greenhouse gas emissions pursuant to Directive 2003/87/EC of the European Parliament and of the Council.

6. CO2 emission factor for transition from the use of a motor vehicle to the use of public transport and cycling transport shall be calculated in accordance with Sub-paragraphs 6.1 and 6.3 of this Annex or shall be determined in accordance with Sub-paragraphs 6.2 and 6.4 of this Regulation:

6.1. CO2 emission factor, using a motor vehicle, for measures which provide for transition from the use of a motor vehicle to the use of public transport and cycling transport shall be calculated, using the following formula:

|  |  |
| --- | --- |
|  | , where |

 ‒ CO2 emissions factor, using a motor vehicle, kg CO2/km;

 ‒ CO2 emission factor in accordance with the indicator specified by the manufacturer of the motor vehicle, kg CO2/km;

 ‒ number of passengers in a motor vehicle during the journey;

6.2. if it is not possible to calculate CO2 emission factor in accordance with the formula referred to in Sub-paragraph 6.1 of this Annex, data specified in Table 3 of this Annex shall be used;

Table 3

|  |  |  |  |
| --- | --- | --- | --- |
| Type of fuel used in a motor vehicle | CO2 emission factor ,  kg CO2/km | Number of passengers ,  pieces | CO2 emission factor ,  kg CO2/km |
| Diesel fuel | 0.145 | 2 | 0.0725 |
| Petroleum | 0.185 | 2 | 0.0925 |
| Liquefied petroleum gas (LPG) | 0.160 | 2 | 0.0800 |
| Compressed natural gas (CNG) | 0.163 | 2 | 0.0815 |

6.3. CO2 emission factor, using public transport, for measures which provide for transition from the use of a motor vehicle to the use of public transport shall be calculated, using the following formula:

|  |  |
| --- | --- |
|  | , where |

 ‒ CO2 emissions factor, using public transport, kg CO2/km;

 ‒ average weighted fuel or electricity consumption of public transport, l/km or kWh/km;

 ‒ CO2 emission factor for the fuel used in accordance with Table 4 of this Annex, t CO2/TJ or kg CO2/kWh;

 ‒ number of passengers in a public transport vehicle during the journey;

6.4. if it is not possible to calculate CO2 emission factor in accordance with the formula referred to in Sub-paragraph 6.3 of this Annex, data specified in Table 4 of this Annex shall be used.

Table 4

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Type of public transport and type of fuel used | Fuel consumption , l/km or kWh/km | CO2 emission factor , t CO2/TJ or kg CO2/kWh | Number of passengers | CO2 emission factor , kg CO2/km |
| Bus  (diesel fuel, l/km) | 0.4 | in accordance with the formula referred to in Paragraph 5 of this Annex and Paragraph 39 of the Regulation | 153 | 0.0069 |
| Train  (diesel fuel, l/km) | 1.73 | in accordance with the formula referred to in Paragraph 5 of this Annex and Paragraph 39 of the Regulation | 420 | 0.011 |
| Train  (electricity, kWh/km) | 12.31 | according to Paragraph 1 of this Annex | 420 | 0.0032 |
| High-floor tram (electricity, kWh/km) | 2.46 | according to Paragraph 1 of this Annex | 334 | 0.0008 |
| Low-floor tram (electricity, kWh/km) | 7.71 | according to Paragraph 1 of this Annex | 318 | 0.0026 |
| Standard trolley bus (electricity, kWh/km) | 2.47 | according to Paragraph 1 of this Annex | 110 | 0.0025 |
| Articulated trolleybus (electricity, kWh/km) | 3.21 | according to Paragraph 1 of this Annex | 220 | 0.0016 |

7. Data characterising biodegradable waste subject to use for the production of biogas are specified in Table 5 of this Annex. If data characterising biodegradable waste obtained in laboratory settings are at the disposal of the entity which implements the measure, the relevant data obtained in laboratory settings shall be used for the calculation of the amount of GHG emissions.

Table 5

|  |  |  |
| --- | --- | --- |
| Type of biodegradable waste | Content of dry matter | Content of dry organic matter |
| Food waste | 0.10 | 0.80 |
| Waste of milk processing establishments | 0.06 | 0.89 |
| Fallen leaves | 0.59 | 0.86 |
| Cut grass | 0.19 | 0.84 |
| Sewage sludge | 0.16 | 0.82 |
| Slaughterhouse and bird processing waste | 0.15 | 0.80 |
| Pig manure | 0.05 | 0.91 |
| Livestock manure | 0.08 | 0.85 |
| Bird manure | 0.20 | 0.80 |

8. Biogas formation potential depending on the type of biodegradable waste used is specified in Table 6 of this Annex.

Table 6

|  |  |
| --- | --- |
| Type of biodegradable waste | Biogas formation potential , m3/t dry organic matter |
| Food waste | 600 |
| Waste of milk processing establishments | 650 |
| Fallen leaves | 250 |
| Cut grass | 300 |
| Sewage sludge | 250 |
| Slaughterhouse and bird processing waste | 625 |
| Pig manure | 475 |
| Livestock manure | 300 |
| Bird manure | 525 |

9. The global-warming potential of fluorinated greenhouse gases (F-gases) is specified in Table 7 of this Annex.

Table 7

|  |  |
| --- | --- |
| Industrial designation of F-gas | Global-warming potential |
| HFC-23 | 14800 |
| HFC-32 | 675 |
| HFC-125 | 3500 |
| HFC-134a | 1430 |
| HFC-143a | 4470 |
| HFC-152a | 124 |
| HFC-245fa | 1030 |
| HFC-365mfc | 794 |
| HFC-227ea | 3220 |
| SF6 | 22800 |
| Other F-gases | In accordance with Annex I to Regulation No 517/2014\* |

Note. \* Regulation (EU) No 517/2014 of the European Parliament and of the Council of 16 April 2014 on fluorinated greenhouse gases and repealing Regulation (EC) No 842/2006.

10. The global-warming potential of nitrous oxide (N2O) and methane (CH4) is specified in Table 8 of this Annex.

Table 8

|  |  |
| --- | --- |
| SEG | Global-warming potential |
| N2O | 298 t CO2 equiv./t N2O |
| CH4 | 25 t CO2 equiv./t CH4 |

Note. In accordance with Decision No 24/CP.19, Revision of the UNFCCC reporting guidelines on annual inventories for Parties included in Annex I to the Convention.

Minister for Environmental Protection and Regional Development Kaspars Gerhards

**Annex 2**

Cabinet Regulation No. 42

23 January 2018

**Combustion Heat Factors of Fuel, Conversion Coefficients, Wood Fuel Measurement Unit Conversion Coefficients and Density of Wood Fuel**

1. Conversion coefficients of fuel required for the calculation for transition from the lower heating value for the reaction mass of fuel to the higher heating value for the reaction mass of fuel are specified in Table 1 of this Annex.

Table 1

|  |  |
| --- | --- |
| Type of fuel | Conversion coefficient, f |
| Coal (anthracite) | 1.04 |
| Brown coal (lignite) | 1.07 |
| Diesel fuel (gas oil/diesel oil) | 1.06 |
| Liquefied petroleum gas | 1.09 |
| Natural gas | 1.11 |
| Wood | 1.08 |
| Other fuels | 1.10 |

2. The higher heating value for the reaction mass of fuel shall be calculated, using the following formula:

|  |  |
| --- | --- |
|  | , where |

 ‒ the higher heating value for the reaction mass of fuel, MJ/kg or MJ/m3;

 ‒ the lower heating value for the reaction mass of fuel, MJ/kg or MJ/m3;

 ‒ conversion coefficient from the lower heating value for the reaction mass of fuel to the higher heating value for the reaction mass of fuel.

3. Humidity of wood fuel and the lower heating value for the reaction mass of fuel are specified in Table 2 of this Annex.

Table 2

|  |  |  |  |
| --- | --- | --- | --- |
| Type of wood | Humidity, % | Lowest combustion heat ,  GJ/cieš. m3, GJ/ber. m3, GJ/t | |
| Firewood | 10 | 16.24 | GJ/cieš. m3 |
| 20 | 14.16 |
| 30 | 12.09 |
| 40 | 10.01 |
| 51 | 7.73 |
| 55 | 6.90 |
| Wood residues | 57.2 | 2.69 | GJ/ber. m3 |
| Woodchips | 44.7 | 3.26 |
| Wood briquettes | 9.65 | 16.78 | GJ/t |
| Wood pellets | 7.38 | 17.54 |

4. Conversion coefficients of wood fuel measurement units are specified in Table 3 of this Annex.

Table 3

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Measurement units | Piled wood (firewood), m3 | Dense wood, cieš. m3 | Loose wood (woodchips), ber. m3 | Dry matter,  t |
| Piled wood (firewood), m3 | 1 | 0.6 | 1.5 | 0.27 |
| Dense wood, cieš. m3 | 1.67 | 1 | 2.5 | 0.45 |
| Loose wood (woodchips), ber. m3 | 0.67 | 0.4 | 1 | 0.18 |
| Dry matter, t | 3.7 | 2.22 | 5.6 | 1 |

5. Density of wood fuel is specified in Table 4 of this Annex.

Table 4

|  |  |  |  |
| --- | --- | --- | --- |
| Moisture content  % | Dense wet wood,  kg/cieš. m3 | Loose we wood,  kg/ber. m3 | Piled wet wood,  kg/m3 |
| 0 | 450 | 180 | 270 |
| 30 | 643 | 257 | 386 |
| 40 | 750 | 300 | 450 |
| 50 | 900 | 360 | 540 |
| 55 | 1000 | 400 | 600 |

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