



EUROPEAN
COMMISSION

Brussels, 30.11.2016
COM(2016) 759 final

ANNEXES 1 to 11

ANNEXES

to the

**Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE
COUNCIL**

on the Governance of the Energy Union,

**amending Directive 94/22/EC, Directive 98/70/EC, Directive 2009/31/EC,
Regulation (EC) No 663/2009, Regulation (EC) No 715/2009, Directive 2009/73/EC,
Council Directive 2009/119/EC, Directive 2010/31/EU, Directive 2012/27/EU, Directive
2013/30/EU and Council Directive (EU) 2015/652 and repealing Regulation (EU) No
525/2013**

{ SWD(2016) 394 final }

{ SWD(2016) 395 final }

{ SWD(2016) 396 final }

{ SWD(2016) 397 final }

ANNEX I

GENERAL FRAMEWORK FOR INTEGRATED NATIONAL ENERGY AND CLIMATE PLANS

Part 1

General framework

SECTION A: NATIONAL PLAN	
1. OVERVIEW AND PROCESS FOR ESTABLISHING THE PLAN	
1.1. Executive Summary	<ul style="list-style-type: none"> i. Political, economic, environmental, and social context of the plan ii. Overarching strategy covering the five dimensions of the Energy Union iii. Overview table with key objectives, policies and measures of the plan
1.2. Overview of current policy situation	<ul style="list-style-type: none"> i. National and EU energy system and policy context of the national plan ii. Current energy and climate policies and measures across the five dimensions of the Energy Union iii. Key issues of cross-border relevance iv. Administrative structure of implementing national energy and climate policies
1.3. Consultations and involvement of national and EU entities and their outcome	<ul style="list-style-type: none"> i. Involvement of the Parliament ii. Involvement of local and regional authorities iii. Consultations with stakeholders, including social partners, and engagement of civil society iv. Consultations with other Member States v. Iterative process with the European Commission
1.4. Regional cooperation in preparing the plan	<ul style="list-style-type: none"> i. Elements subject to joint or coordinated planning with other Member States ii. Explanation of how regional cooperation is considered in the plan
2. NATIONAL OBJECTIVES AND TARGETS	
2.1. Dimension Decarbonisation	<p>2.1.1. GHG emissions and removals (for the plan covering the period from 2021 to 2030, the 2030 Framework target of at least 40% domestic reduction in economy-wide greenhouse gas emissions as compared to 1990)¹</p> <ul style="list-style-type: none"> i. The Member State's binding national 2030 target for greenhouse gas emissions in the non-ETS-sectors, the annual binding national limits² and the commitments under the LULUCF Regulation³

¹ Consistency to be ensured with long-term low emission strategies pursuant to Article 14.

² For the plan covering the period from 2021 to 2030: Member State's binding national 2030 target for greenhouse gas emissions in the non-ETS sectors and the annual binding limits as set under Regulation [] [ESR].

ii.	If applicable, other national objectives and targets consistent with existing long-term low emission strategies. If applicable, other objectives and targets, including sector targets and adaptation goals
2.1.2. Renewable energy (2030 Framework target)	
i.	The Member State's planned share of energy from renewable sources in gross final consumption of energy in 2030 as its national contribution to achieve the binding EU-level target of at least 27% in 2030
ii.	A linear trajectory for the overall share of renewable energy in gross final energy consumption from 2021 to 2030 to achieve the binding EU-level target
iii.	Trajectories for the sectorial share of renewable energy in final energy consumption from 2021 to 2030 in the electricity, heating and cooling, and transport sector
iv.	Trajectories by renewable energy technology that the Member State projects to use to achieve the overall and sectorial trajectories for renewable energy from 2021 to 2030 including expected total gross final energy consumption per technology and sector in Mtoe and total planned installed capacity (divided by new capacity and repowering) per technology and sector in MW
v.	Trajectories on bioenergy demand, disaggregated between heat, electricity and transport, and on biomass supply by feedstocks, domestic production vs imports. For forest biomass, an assessment of its source and impact on the LULUCF sink
vi.	If applicable, other national trajectories and objectives, including long term or sectorial ones (e.g. share of advanced biofuels, share of renewable energy in district heating, renewable energy use in buildings, renewable energy produced by cities, energy communities and self-consumers)
2.2. Dimension Energy efficiency (2030 Framework target)	
i.	The indicative national energy efficiency contribution to achieving the Union's binding energy efficiency target of 30% in 2030 as referred to in Article 1(1) and Article 3(4) of Directive 2012/27/EU [as amended by proposal COM(2016)761], based on either primary or final energy consumption, primary or final energy savings, or energy intensity; expressed in terms of absolute level of primary energy consumption and final energy consumption in 2020 and 2030, with a linear trajectory for that contribution from 2021 onwards; including the underlying methodology and the conversion factors used
ii.	Cumulative amount of energy savings to be achieved over the period 2021-2030 under Article 7 of Directive 2012/27/EU [as amended by proposal COM(2016)761], on energy saving obligations
iii.	Objectives for the long-term renovation of the national stock of residential and commercial buildings (both public and private)
iv.	The total floor area to be renovated or equivalent annual energy savings to be achieved from 2021 to 2030 under Article 5 of Directive 2012/27/EU, on the renovation of central government buildings
v.	If applicable, other national objectives, including long term targets or strategies and sectorial targets. National objectives in areas such as energy

efficiency in the transport sector and with regard to heating and cooling	
2.3. Dimension Energy security	
i.	National objectives with regard to increasing the diversification of energy sources and supply from third countries, storage and demand response
ii.	National objectives with regard to reducing energy import dependency from third countries
iii.	National objectives with regard to readiness to cope with constrained or interrupted supply of an energy source (including gas and electricity) and, where appropriate, a timeframe for when the objectives shall be met ⁴
iv.	National objectives with regard to deployment of domestic energy sources (notably renewable energy)
2.4. Dimension Internal energy market	
2.4.1. Electricity interconnectivity (2030 Framework target)	
i.	The level of electricity interconnectivity that the Member State aims for in 2030 in relation to the October 2014 European Council objective
2.4.2. Energy transmission infrastructure	
i.	Key national objectives for electricity and gas transmission infrastructure that are necessary for the achievement of objectives and targets under any of the dimensions listed in 2
ii.	If applicable, main infrastructure projects envisaged other than Projects of Common Interest (PCIs) ⁵
2.4.3. Market integration	
i.	National objectives related to other aspects of the internal energy market such as market integration and coupling, if applicable, including a timeframe for when the objectives shall be met
ii.	National objectives with regard to ensuring electricity system adequacy, if applicable, as well as for the flexibility of the energy system with regard to renewable energy production, including a timeframe for when the objectives shall be met
iii.	National objectives to protect energy consumers and improve the competitiveness of the retail energy sector
2.4.4. Energy poverty	
i.	National objectives with regard to energy poverty including a timeframe for when the objectives shall be met
2.5. Dimension Research, innovation and competitiveness	
i.	National objectives and funding targets for public and private research and innovation relating to the Energy Union including, if appropriate, a timeframe

⁴ Consistency shall be ensured with the preventive action and emergency plans under Regulation [as proposed by COM(2016) 52] concerning measures to safeguard the security of gas supply and repealing Regulation (EU) No 994/2010, as well as the risk preparedness plans under Regulation [as proposed by COM(2016) 862] on risk-preparedness in the electricity sector and repealing Directive 2005/89/EC.

⁵ In accordance with Regulation (EU) No 347/2013 of the European Parliament and of the Council of 17 April 2013 on guidelines for trans-European energy infrastructure and repealing Decision No 1364/2006/EC and amending Regulations (EC) No 713/2009, (EC) No 714/2009 and (EC) No 715/2009 (OJ L 115, 25.4.2013, p. 39).

	for when the objectives shall be met; reflecting the priorities of the Energy Union Strategy and the SET-Plan
ii.	If appropriate, national objectives including long term targets (2050) for deployment of low-carbon technologies, including for decarbonising energy- and carbon-intensive industrial sectors and, if applicable, for related carbon transport and storage infrastructure
iii.	National objectives with regard to competitiveness
3. POLICIES AND MEASURES	
3.1. Dimension Decarbonisation	
3.1.1. GHG emissions and removals (for the plan covering the period from 2021 to 2030, the 2030 Framework target)	
i.	Policies and measures to achieve the target set under Regulation [] [ESR] as referred in 2.1.1 and policies and measures to comply with Regulation [] [LULUCF], covering all key emitting sectors and sectors for the enhancement of removals, with an outlook to the long-term vision and goal to become a low-carbon economy with a 50 years perspective and achieving a balance between emissions and removals in accordance with the Paris Agreement
ii.	Regional cooperation in this area
iii.	Without prejudice to the applicability of state aid rules, financing measures, including EU support and the use of EU funds, in this area at national level, if applicable
3.1.2. Renewable energy (2030 Framework target)	
i.	Policies and measures to achieve the national contribution to the binding EU-level 2030 target for renewable energy and trajectories as presented in 2.1.2 including sector- and technology-specific measures ⁶
ii.	Specific measures for regional cooperation, as well as the estimated excess production of energy from renewable sources which could be transferred to other Member States in order to achieve the national contribution and trajectories presented in 2.1.2
iii.	Specific measures on financial support, including EU support and the use of EU funds, for the promotion of the production and use of energy from renewable sources in electricity, heating and cooling, and transport
iv.	Specific measures to introduce a one-stop-shop, streamline administrative procedures, provide information and training, and empower renewable self-consumers and energy communities
v.	Assessment of the necessity to build new infrastructure for district heating and cooling produced from renewable energy sources
vi.	Specific measures on the promotion of the use of energy from biomass, especially for new biomass mobilisation taking into account: <ul style="list-style-type: none"> - biomass availability: both domestic potential and imports from third countries - other biomass uses by other sectors (agriculture and forest-based sectors); as

⁶ When planning these measures, Member States shall take into account the end of life of existing installations and the potential for repowering.

well as measures for the sustainability of biomass production and use	
3.1.3. Other elements of the dimension	
i.	National policies and measures affecting the ETS sector and assessment of the complementarity and impacts on the EU ETS, if applicable
ii.	Strategies, plans and measures on adaptation to climate change
iii.	Policies and measures to achieve other national targets, if applicable
iv.	Policies and measures to achieve low emission mobility (including electrification of transport)
3.2. Dimension Energy efficiency (2030 Framework target)	
Planned policies, measures and programmes to achieve the indicative national energy efficiency target for 2030 as well as other objectives presented in 2.2, including planned measures and instruments (also of financial nature) to promote the energy performance of buildings, in particular as regards to the following:	
i.	Energy efficiency obligation schemes and alternative measures under Article 7 of Directive 2012/27/EU [as amended by proposal COM(2016)761] (to be prepared in accordance with Annex II)
ii.	Long-term strategy for the renovation of the national stock of residential and commercial buildings (both public and private) ⁷ including policies and measures to stimulate cost-effective deep and staged deep renovations
iii.	Description of policy and measures to promote energy services in the public sector and measures to remove regulatory and non-regulatory barriers that impede the uptake of energy performance contracting and other energy efficiency service models ⁸
iv.	Other planned policies, measures and programmes to achieve the indicative national energy efficiency target for 2030 as well as other objectives presented in 2.2 (for example measures to promote the exemplary role of public buildings and energy-efficient public procurement, measures to promote energy audits and energy management systems ⁹ , consumer information and training measures ¹⁰ , and other measures to promote energy efficiency ¹¹)
v.	Description of measures to develop measures to utilise energy efficiency potentials of gas and electricity infrastructure ¹²
vi.	Regional cooperation in this area, if applicable
vii.	Financing measures, including EU support and the use of EU funds, in the area at national level
3.3. Dimension Energy security¹³	
i.	Policies and measures to achieve the objectives set out in 2.3 ¹⁴

⁷ In accordance with Article 2a of Directive 2010/31/EU [as amended by proposal COM(2016)765].

⁸ In accordance with Article 18 of Directive 2012/27/EU.

⁹ In accordance with Article 8 of Directive 2012/27/EU.

¹⁰ In accordance with Articles 12 and 17 of Directive 2012/27/EU

¹¹ In accordance with Article 19 of Directive 2012/27/EU.

¹² In accordance with Article 15(2) of Directive 2012/27/EU.

¹³ Policies and measures shall reflect the energy efficiency first principle.

¹⁴ Consistency shall be ensured with the preventive action and emergency plans under Regulation [as proposed by COM(2016) 52] concerning measures to safeguard the security of gas supply and repealing

<ul style="list-style-type: none"> ii. Regional cooperation in this area iii. Financing measures, including EU support and the use of EU funds, in this area at national level, if applicable
<p>3.4. Dimension Internal energy market¹⁵</p> <p>3.4.1. Electricity infrastructure</p> <ul style="list-style-type: none"> i. Policies and measures to achieve the targeted level of interconnectivity presented in 2.4.1 ii. Regional cooperation in this area¹⁶ iii. Financing measures, including EU support and the use of EU funds, in this area at national level, if applicable <p>3.4.2. Energy transmission infrastructure</p> <ul style="list-style-type: none"> i. Policies and measures to achieve the key infrastructure objectives presented in 2.4.2, including, if applicable, specific measures to enable the delivery of Projects of Common Interest (PCIs) and other key infrastructure projects ii. Regional cooperation in this area¹⁷ iii. Financing measures, including EU support and the use of EU funds, in this area at national level, if applicable <p>3.4.3. Market integration</p> <ul style="list-style-type: none"> i. Policies and measures to achieve the objectives set out in 2.4.3 ii. Measures to increase the flexibility of the energy system with regard to renewable energy production, including the roll-out of intraday market coupling and cross-border balancing markets iii. Measures to ensure priority access and dispatch of electricity produced from renewable energy sources or high-efficiency cogeneration and prevent the curtailment or re-dispatch of this electricity¹⁸ iv. Policies and measures to protect consumers, especially vulnerable and energy poor consumers, and to improve the competitiveness and contestability of the retail energy market v. Description of measures to enable and develop demand response including those addressing tariffs to support dynamic pricing¹⁹ <p>3.4.4. Energy Poverty</p> <ul style="list-style-type: none"> i. Policies and measures to achieve the objectives set out in 2.4.4
<p>3.5. Dimension Research, innovation and competitiveness</p> <ul style="list-style-type: none"> i. Policies and measures including those to achieve the objectives set out in 2.5 ii. Cooperation with other Member States in this area, including information on how the SET Plan objectives and policies are being translated to a national

Regulation (EU) No 994/2010, as well as the risk preparedness plans under Regulation [as proposed by COM(2016) 862] on risk-preparedness in the electricity sector and repealing Directive 2005/89/EC.

¹⁵ Policies and measures shall reflect the energy efficiency first principle.

¹⁶ Other than the PCI Regional Groups established under Regulation (EU) No 347/2013.

¹⁷ Other than the PCI Regional Groups established under Regulation (EU) No 347/2013.

¹⁸ In accordance with [recast of Directive 2009/72/EC as proposed by COM(2016) 864 and recast of Regulation (EC) No 714/2009 as proposed by COM(2016) 861]

¹⁹ In accordance with Article 15(8) of Directive 2012/27/EU.

context

- iii. Financing measures, including EU support and the use of EU funds, in this area at national level, if applicable

SECTION B: ANALYTICAL BASIS²⁰	
4. CURRENT SITUATION AND PROJECTIONS WITH EXISTING POLICIES AND MEASURES^{21,22}	
4.1. Projected evolution of main exogenous factors influencing energy system and GHG emission developments <ul style="list-style-type: none"> i. Macroeconomic forecasts (GDP and population growth) ii. Sectorial changes expected to impact the energy system and GHG emissions iii. Global energy trends, international fossil fuel prices, ETS carbon price iv. Technology cost developments 	
4.2. Dimension Decarbonisation <p>4.2.1. GHG emissions and removals</p> <ul style="list-style-type: none"> i. Trends in current GHG emissions and removals in ETS, Effort Sharing Regulation and LULUCF sectors and different energy sectors ii. Projections of sectorial developments with existing national and EU policies and measures at least until 2040 (including for the year 2030) <p>4.2.2. Renewable energy</p> <ul style="list-style-type: none"> i. Current share of renewable energy in gross final energy consumption and in different sectors (heating and cooling, electricity and transport) as well as per technology in each of these sectors ii. Projections of development with existing policies and measures at least until 2040 (including for the year 2030) 	
4.3. Dimension Energy efficiency <ul style="list-style-type: none"> i. Current primary and final energy consumption in the economy and per sector (including industry, residential, service and transport) ii. Current potential for the application of high-efficiency cogeneration and efficient district heating and cooling²³ iii. Projections considering existing energy efficiency policies, measures and programmes as described under 1.2. ii) for primary and final energy consumption for each sector at least until 2040 (including for the year 2030)²⁴ 	

²⁰ See Part 2 for a detailed list of parameters and variables to be reported in Section B of the Plan.

²¹ Current situation shall reflect the date of submission of the national plan (or latest available date). Existing policies and measures encompass implemented and adopted policies and measures. Adopted policies and measures are those for which an official government decision has been made by the date of submission of the national plan and there is a clear commitment to proceed with implementation. Implemented policies and measures are those for which one or more of the following applies at the date of submission of the national plan: national legislation is in force, one or more voluntary agreements have been established, financial resources have been allocated, human resources have been mobilised.

²² The selection of exogenous factors may be based on the assumptions made in the EU Reference Scenario 2016 or other subsequent policy scenarios for the same variables. Besides, Member States specific results of the EU Reference Scenario 2016 as well as results of subsequent policy scenarios may also be a useful source of information when developing national projections with existing policies and measures and impact assessments.

²³ In accordance with Article 14(1) of Directive 2012/27/EU.

²⁴ This reference business as usual projection shall be the basis for the 2030 final and primary energy consumption target which is described in 2.3 and conversion factors.

iv.	Cost-optimal levels of minimum energy performance requirements resulting from national calculations, according to Article 5 of Directive 2010/31/EU
4.4. Dimension Energy security	
i.	Current energy mix, domestic energy resources, import dependency, including relevant risks
ii.	Projections of development with existing policies and measures at least until 2040 (including for the year 2030)
4.5. Dimension Internal energy market	
4.5.1. Electricity interconnectivity	
i.	Current interconnection level and main interconnectors ²⁵
ii.	Projections of interconnector expansion requirements at least until 2040 (including for the year 2030) ²⁶
4.5.2. Energy transmission infrastructure	
i.	Key characteristics of the existing transmission infrastructure for electricity and gas ²⁷
ii.	Projections of network expansion requirements at least until 2040 (including for the year 2030) ²⁸
4.5.3. Electricity and gas markets, energy prices	
i.	Current situation of electricity and gas markets, including energy prices
ii.	Projections of development with existing policies and measures at least until 2040 (including for the year 2030)
4.6. Dimension Research, innovation and competitiveness	
i.	Current situation of the low-carbon-technologies sector and its position on the global market
ii.	Current level of public and private research and innovation spending on low-carbon-technologies, current number of patents, and current number of researchers
iii.	Current level of energy costs including in the international context
iv.	Projections of developments in i. to iii. with existing policies and measures at least until 2040 (including for the year 2030)
5. IMPACT ASSESSMENT OF PLANNED POLICIES AND MEASURES²⁹	
5.1. Impacts of planned policies and measures described in section 3 on energy system and greenhouse gas emissions and removals including comparison to projections with existing policies and measures (as described in section 4).	

²⁵ With reference to overviews of existing transmission infrastructure by Transmission System Operators (TSOs).

²⁶ With reference to national network development plans and regional investment plans of TSOs.

²⁷ With reference to overviews of existing transmission infrastructure by TSOs.

²⁸ With reference to national network development plans and regional investment plans of TSOs.

²⁹ Planned policies and measures are options under discussion and having a realistic chance of being adopted and implemented after the date of submission of the national plan. The resulting projections under section 5.1.i shall therefore include not only implemented and adopted policies and measures (projections with existing policies and measures), but also planned policies and measures.

i.	Projections of the development of the energy system and greenhouse gas emissions and removals as well as of emissions of air pollutants in accordance with Directive [as proposed by COM/2013/0920] ³⁰ under the planned policies and measures at least until ten years after the period covered by the plan (including for the last year of the period covered by the plan), including relevant EU policies and measures.
ii.	Assessment of policy interactions (between existing and planned policies and measures within a policy dimension and between existing and planned policies and measures of different dimensions) at least until the last year of the period covered by the plan
5.2. Macroeconomic, environmental, skills and social impacts (in terms of costs and benefits as well as cost-effectiveness) of the planned policies and measures described in section 3 at least until the last year of the period covered by the plan, including comparison to projections with existing policies and measures	
5.3. Impacts of planned policies and measures described in section 3 on other Member States and regional cooperation at least until the last year of the period covered by the plan, including comparison to projections with existing policies and measures	
i.	Impacts on the energy system in neighbouring and other Member States in the region to the extent possible
ii.	Impacts on energy prices, utilities and energy market integration
iii.	Impacts on regional cooperation

Part 2

List of parameters and variables to be reported in Section B of National Plans^{31 32 33 34}

The following parameters, variables, energy balances and indicators are to be reported in Section B 'Analytical Basis' of the National Plans:

1. General parameters and variables

- (1) Population [million]
- (2) GDP [euro million]
- (3) Sectorial gross value added (incl. main industrial, construction, services, and agriculture sectors) [euro million]
- (4) Number of households [thousands]

³⁰ Directive [as proposed by COM/2013/0920] on the reduction of national emissions of certain atmospheric pollutants, amending Directive 2003/35/EC and repealing Directive 2001/81/EC.

³¹ For the plan covering the period from 2021 to 2030: For each parameter/variable in the list, trends over the years 2005-2040 (2005-2050 where appropriate) including for the year 2030 in five year intervals shall be reported both in section 4 and 5. Parameter based on exogenous assumptions vs. modelling output shall be indicated.

³² As far as possible, reported data and projections shall build on and be consistent with EUROSTAT data and methodology used for reporting European statistics in respective sectorial legislations, as European statistics are the primary source of statistical data used for reporting and monitoring, in accordance with Regulation (EC) No 223/2009 on European statistics.

³³ Note: all projections are to be performed on the basis of constant prices (2016 prices used as base year)

³⁴ The Commission will provide recommendations for key parameters for projections, at least covering oil, gas, and coal import prices as well as EU ETS carbon prices.

- (5) Household size [inhabitants/households]
- (6) Disposable income of households [euro]
- (7) Number of passenger-kilometres: all modes, i.e. split between road (cars and buses separated if possible), rail, aviation and domestic navigation (when relevant) [million pkm]
- (8) Freight transport tonnes-kilometres: all modes excluding international maritime, i.e. split between road, rail, aviation, domestic navigation (inland waterways and national maritime) [million tkm]
- (9) International oil, gas and coal fuel import prices [euro/GJ or euro/toe] – aligned with Commission's recommendations
- (10) EU-ETS carbon price [euro/EUA] - aligned with Commission's recommendations
- (11) Exchange rates to euro and to US Dollar (if applicable) assumptions [euro/ currency and USD/currency]
- (12) Number of Heating Degree Days (HDD)
- (13) Number of Cooling Degree Days (CDD)
- (14) Technology cost assumptions used in modelling for main relevant technologies

2. Energy balances and indicators

2.1. Energy supply

- (1) Indigenous Production by fuel type (all energy products: coal, crude oil, natural gas, nuclear energy, renewable energy sources) [ktoe]
- (2) Net imports by fuel type (including electricity and split into intra- and extra European net imports) [ktoe]
- (3) Import dependency from third countries [%]
- (4) Main import sources (countries) for main energy carriers (including gas and electricity)
- (5) Gross Inland Consumption by fuel type source (incl. solids, all energy products: coal, crude oil and petroleum products, natural gas, nuclear energy, electricity, derived heat, renewables, waste) [ktoe]

2.2. Electricity and heat

- (1) Gross electricity generation [GWhe]
- (2) Gross electricity generation by fuel (all energy products) [GWhe]
- (3) Share of combined heat and power generation in total electricity and heat generation [percentage]
- (4) Capacity electricity generation by source including retirements and new investments (MW)
- (5) Heat generation from thermal power generation
- (6) Heat generation from combined heat and power plants, including industrial waste heat

- (7) Cross-border interconnection capacities for gas and electricity [Definition for electricity in line with outcome of ongoing discussions on basis for 15% interconnection target] and their projected usage rates

2.3. Transformation sector

- (1) Fuel inputs to Thermal Power generation (incl. solids, oil, gas) [ktoe]
(2) Fuel inputs to other conversion processes [ktoe]

2.4. Energy consumption

- (1) Primary and final energy consumption [ktoe]
(2) Final energy consumption by sector (incl. industry, transport (split between passenger and freight, when available), households, services, agriculture) [ktoe]
(3) Final energy consumption by fuel (all energy products) [ktoe]
(4) Final non-energy consumption [ktoe]
(5) Primary energy intensity of the overall economy (primary energy consumption per GDP [toe/euro]
(6) Final energy intensity by sector (incl. industry, residential, tertiary, passenger transport (incl. split between passenger and freight, when available), freight transport)

2.5. Prices

- (1) Electricity prices by type of using sector (residential, industry, tertiary)
(2) National retail fuel prices (including taxes, per source and sector) (euro/ktoe)

2.6. Investments

Energy-related investment costs compared to GDP (and compared to gross value added for the industry sector)

2.7. Renewables

- (1) Gross final consumption of energy from renewable sources and share of renewable energy in gross final energy consumption and by sector (electricity, heating and cooling, transport) and by technology
(2) Electricity and heat generation from renewable energy in buildings (as defined in Article 2(1) of Directive 2010/31/EU; this shall include disaggregated data on energy produced, consumed and injected into the grid by solar photovoltaic systems, solar thermal systems, biomass, heat pumps, geothermal systems, as well as all other decentralized renewables systems)
(3) If applicable, other national trajectories, including long term or sectorial ones (the share of food-based and advanced biofuels, the share of renewable energy in district heating, as well as the renewable energy produced by cities and energy communities as defined by Article 22 of [recast of Directive 2009/28/EC as proposed by COM(2016) 767])

3. GHG emissions and removals related indicators

- (1) GHG emissions by policy sector (ETS, Effort Sharing Regulation and LULUCF)
(2) GHG emissions by IPCC sector and by gas (where relevant split into ETS and ESD) [tCO₂eq]

- (3) Carbon Intensity of the overall economy [tCO₂eq/GDP]
- (4) CO₂ emission related indicators
 - (a) Carbon intensity of electricity and steam production [tCO₂eq/MWh]
 - (b) Carbon intensity of final energy demand by sector (incl. industry, residential, tertiary, passenger transport, freight transport) [tCO₂eq/toe]
- (5) Non-CO₂ emission related parameters
 - (a) Livestock: Dairy cattle (1000 heads), Non-dairy cattle (1000 heads), Sheep (1000 heads), Pig (1000 heads), Poultry (1000 heads)
 - (b) Nitrogen input from application of synthetic fertilizers (kt nitrogen)
 - (c) Nitrogen input from application of manure (kt nitrogen)
 - (d) Nitrogen fixed by N-fixing crops (kt nitrogen)
 - (e) Nitrogen in crop residues returned to soils (kt nitrogen)
 - (f) Area of cultivated organic soils (hectares)
 - (g) Municipal solid waste (MSW) generation
 - (h) Municipal solid waste (MSW) going to landfills
 - (i) Share of CH₄ recovery in total CH₄ generation from landfills (%)

**NOTIFICATION OF MEMBER STATES' MEASURES AND METHODOLOGIES TO
IMPLEMENT ARTICLE 7 OF DIRECTIVE 2012/27/EU [AS AMENDED BY
PROPOSAL COM(2016)761]**

Member States shall notify to the Commission their proposed detailed methodology pursuant to Annex V(4) of Directive 2012/27/EU for the operation of the energy efficiency obligation schemes and alternative measures referred to in Articles 7a and 7b and Article 20(6) of the same directive.

1. Calculation of the level of the energy savings requirement to be achieved over the whole period from 1 January 2021 to 31 December 2030, showing how the following elements are taken into account:
 - (a) annual energy sales, by, volume to final customers of all energy distributors or all retail energy companies averaged over the three years (2016, 2017, 2018) prior 1 January 2019 [in ktoe];
 - (b) volume of sales of energy used in transport excluded from the calculation [in ktoe];
 - (c) quantity of energy generated for own use excluded from the calculation [in ktoe];
 - (d) sources used in the calculation of energy sales data including justification for the use of alternative statistical sources and any differences of the resulting quantities (if other sources than Eurostat are used);
 - (e) cumulative amount of energy savings to be achieved over the whole period from 1 January 2021 to 31 December 2030 (before the exemptions under paragraph 2) [in ktoe];
 - (f) application of exemptions (b), (c), (d) and (e) referred to Article 7(2) and (3) of Directive 2012/27/EU:
 - (i) volume of sales of energy used in industrial activities [in ktoe] listed in Annex I to Directive 2003/87/EC excluded from the calculation in line with point (b),
 - (ii) amount of energy savings [in ktoe] achieved in the energy transformation, distribution and transmission sectors in line with point (c),
 - (iii) amount of energy savings [in ktoe] resulting from individual actions newly implemented since 31 December 2008 that continue to have an impact in 2020 and beyond and in line with point (d);
 - (iv) amount of energy generated on or in buildings for own use as a result of policy measures promoting new installation of renewable energy technologies in line with point (e) [in ktoe];
 - (g) total cumulative amount of energy savings (after the exemptions under paragraph 2 applied) [in ktoe].
2. **Policy measures in view of the achievement of the savings requirement referred to in Article 7(1) of Directive 2012/27/EU:**
 - 2.1. **Energy efficiency obligation schemes referred to in Article 7a of Directive 2012/27/EU:**

- (a) description of the energy efficiency obligation scheme;
- (b) expected cumulative and annual amount of savings and duration of the obligation period(s);
- (c) obligated parties and their responsibilities;
- (d) target sectors;
- (e) eligible actions foreseen under the measure;
- (f) information on application of provisions under Article 7(7) of Directive 2012/27/EU:
 - (i) specific actions, share of savings to be achieved in households affected by energy poverty and in social housing in line with point (a);
 - (ii) savings achieved by energy service providers or other third parties in line with point (b);
 - (iii) banking and borrowing in line with point (c);
- (g) Information on trading of energy savings (if relevant).

2.2. Alternative measures referred to in Article 7b and Article 20(6) of Directive 2012/27/EU (except taxation):

- (a) type of policy measure;
- (b) brief description of the policy measure including the design features per each policy measure notified;
- (c) expected total cumulative and annual amount of savings per each measure and/or amount of energy savings in relation to any intermediate periods;
- (d) implementing, participating, entrusted parties and their responsibilities for implementing the policy measure(s);
- (e) target sectors;
- (f) eligible actions foreseen under the measure;
- (g) specific policy measures or individual actions targeting energy poverty.

2.3. Information on taxation measures:

- (a) brief description of taxation measure;
- (b) duration of taxation measure;
- (c) expected cumulative and annual amount of savings per measure;
- (d) target sectors;
- (e) additionality of energy savings by describing the approach to calculating savings, including price elasticities used in line with annex V(4).

3. Calculation methodology for measures notified under Articles 7a, 7b and 20(6) of Directive 2012/27/EU(except for taxation measures):

- (a) measurement methods used referred to Annex V(1) of Directive 2012/27/EU;
- (b) method to express the energy savings (primary or final energy savings);
- (c) lifetimes of individual actions and approach used to take into account the lifetime of savings;

- (d) brief description of the calculation methodology including how additionality and materiality of savings are ensured;
- (e) information on how the possible overlaps between the measures and individual actions are addressed to avoid double counting of energy savings;
- (f) climatic variations and approach used (if relevant).

4. Monitoring and verification

- (a) brief description of the monitoring and verification system and the process of the verification;
- (b) implementing public authority and its main responsibilities in charge of monitoring and verification system in relation to the energy efficiency obligation scheme and/ or alternative measures;
- (c) independence of monitoring and verification from the obligated parties and participating, entrusted parties;
- (d) statistically significant proportion of energy efficiency improvement measures and proportion and criteria used to define and select a representative sample;
- (e) reporting obligations for obligated parties (savings achieved by each obligated party, or each sub-category of obligated party, and in total under the scheme).
- (f) publication of energy savings achieved (each year) under the energy efficiency obligation scheme and alternative measures;
- (g) information on penalties applied in case of non-compliance;
- (h) Information on measures foreseen if progress is not satisfactory.

ANNEX III

GHG INVENTORIES INFORMATION

Part 1

Information to be included in the reports referred to in Article 23(2):

- (a) their anthropogenic emissions of greenhouse gases listed in part 2 of this Annex and the anthropogenic emissions of greenhouse gases referred to in Article 2(1) of Regulation [] [ESR] for the year X-2;
- (b) data on their anthropogenic emissions of carbon monoxide (CO), sulphur dioxide (SO₂), nitrogen oxides (NO_x) and volatile organic compounds, consistent with data already reported pursuant to Article 7 of Directive 2001/81/EC for the year X-2;
- (c) their anthropogenic greenhouse gas emissions by sources and removals of CO₂ by sinks resulting from LULUCF, for the year X-2, in accordance with the methodologies specified in part 3 of this Annex. This data shall also be relevant for the compliance report under Article 12 of Regulation [] [LULUCF];
- (d) any changes to the information referred to in points (a) to (c) for the years between the relevant base year or period and the year X-3, indicating the reasons for these changes;
- (e) information on indicators, as set out in part 4 of this Annex, for the year X-2;
- (f) summary information on concluded transfers pursuant to Article 5 of Regulation [] [ESR] and Article 11 of Regulation [] [LULUCF] for the year X-1;
- (g) information on the steps taken to improve inventory estimates, in particular in areas of the inventory that have been subject to adjustments or recommendations following expert reviews;
- (h) the actual or estimated allocation of the verified emissions reported by installation operators under Directive 2003/87/EC to the source categories of the national greenhouse gas inventory and the ratio of those verified emissions to the total reported greenhouse gas emissions in those source categories, for the year X-2;
- (i) the results of the checks performed on the consistency of the emissions reported in the greenhouse gas inventories, for the year X-2, with the verified emissions reported under Directive 2003/87/EC;
- (j) the results of the checks performed on the consistency of the data used to estimate emissions in preparation of the greenhouse gas inventories, for the year X-2, with:
 - (i) the data used to prepare inventories of air pollutants under Directive 2001/81/EC;
 - (ii) the data reported pursuant to Article 19(1) and Annex VII of Regulation (EU) No 517/2014;
 - (iii) the energy data reported pursuant to Article 4 of, and Annex B to, Regulation (EC) No 1099/2008;
- (k) a description of changes to their national inventory system;
- (l) a description of changes to the national registry;
- (m) information on their quality assurance and quality control plans, a general uncertainty assessment, a general assessment of completeness and, any other

elements of the national greenhouse gas inventory report needed to prepare the Union greenhouse gas inventory report;

- (n) information of the Member State's intentions to make use of the flexibilities in Article 5(4) and (5) of Regulation [] [ESR].

A Member State may request derogation from point c to apply a different methodology than specified in Part 3 of this Annex if the methodology improvement required could not be achieved in time for the improvement to be taken into account in the greenhouse gas inventories of the period from 2021 to 2030, or the cost of the methodology improvement would be disproportionately high compared to the benefits of applying such methodology to improve accounting for emissions and removals due to the low significance of the emissions and removals from the carbon pools concerned. Member States wishing to benefit from the derogation shall submit a reasoned request to the Commission by 31 December 2020, indicating the timeline by when the methodology improvement could be implemented and/or the alternative methodology proposed, and an assessment of the potential impacts on the accuracy of accounting. The Commission may request additional information to be submitted within a reasonable time period specified. Where the Commission considers that the request is justified, it shall grant the derogation. If the request is rejected, the Commission shall give reasons for its decision.

Part 2

The greenhouse gases to be covered are:

Carbon dioxide (CO₂)

Methane (CH₄)

Nitrous Oxide (N₂O)

Sulphur hexafluoride (SF₆)

Nitrogen trifluoride (NF₃)

Hydrofluorocarbons (HFCs):

- HFC-23 CHF₃
- HFC-32 CH₂F₂
- HFC-41 CH₃F
- HFC-125 CHF₂CF₃
- HFC-134 CHF₂CHF₂
- HFC-134a CH₂FCF₃
- HFC-143 CH₂FCHF₂
- HFC-143a CH₃CF₃
- HFC-152 CH₂FCH₂F
- HFC-152a CH₃CHF₂
- HFC-161 CH₃CH₂F
- HFC-227ea CF₃CHFCF₃
- HFC-236cb CF₃CF₂CH₂F
- HFC-236ea CF₃CHFCHF₂

- HFC-236fa $\text{CF}_3\text{CH}_2\text{CF}_3$
- HFC-245fa $\text{CHF}_2\text{CH}_2\text{CF}_3$
- HFC-245ca $\text{CH}_2\text{FCF}_2\text{CHF}_2$
- HFC-365mfc $\text{CH}_3\text{CF}_2\text{CH}_2\text{CF}_3$
- HFC-43-10mee $\text{CF}_3\text{CHFCHFCF}_2\text{CF}_3$ or $(\text{C}_5\text{H}_2\text{F}_{10})$

Perfluorocarbons (PFCs):

- PFC-14, Perfluoromethane, CF_4
- PFC-116, Perfluoroethane, C_2F_6
- PFC-218, Perfluoropropane, C_3F_8
- PFC-318, Perfluorocyclobutane, $\text{c-C}_4\text{F}_8$
- Perfluorocyclopropane $\text{c-C}_3\text{F}_6$
- PFC-3-1-10, Perfluorobutane, C_4F_{10}
- PFC-4-1-12, Perfluoropentane, C_5F_{12}
- PFC-5-1-14, Perfluorohexane, C_6F_{14}
- PFC-9-1-18, $\text{C}_{10}\text{F}_{18}$

Part 3 - Methodologies for monitoring and reporting in LULUCF sector

Spatially-explicit land-use conversion data for the identification and tracking of land-use categories and conversions between land-use categories.

Tier 1 methodology using globally calibrated standard emission factors and parameter values in accordance with the 2006 IPCC guidelines for National Greenhouse Gas Inventories.

For emissions and removals for a carbon pool that accounts for at least 25-30% of emissions or removals in a source or sink category which is prioritised within a Member State's national inventory system because its estimate has a significant influence on a country's total inventory of greenhouse gases in terms of the absolute level of emissions and removals, the trend in emissions and removals, or the uncertainty in emissions and removals in the land-use categories, at least Tier 2 methodology using nationally determined emission factors and parameter values calibrated to national circumstances in accordance with the 2006 IPCC guidelines for National Greenhouse Gas Inventories.

Member States are encouraged to apply Tier 3 methodology using non-parametric modelling calibrated to national circumstances, describing the physical interaction of the bio-physical system, in accordance with the 2006 IPCC guidelines for National Greenhouse Gas Inventories.

Part 4 - Inventory indicators

Indicator title	Indicator
TRANSFORMATION B0	Specific CO_2 emissions of public and auto-producer power plants, t/TJ CO_2 emissions from public and auto-producer thermal power stations, kt divided by all products — output by public and auto-producer thermal power stations, PJ
TRANSFORMATION E0	Specific CO_2 emissions of auto-producer plants t/TJ CO_2 emissions from auto-producers, kt divided by All products output by auto-producer thermal power stations, PJ
INDUSTRY A1.1	Total CO_2 intensity — iron and steel industry, t/million euro Total CO_2 emissions from iron and steel, kt divided by gross value added — iron and steel industry

Indicator title	Indicator
INDUSTRY A1.2	Energy-related CO ₂ intensity — chemical industry, t/million euro Energy-related CO ₂ emissions chemical industries, kt divided by gross value added — chemical industry
INDUSTRY A1.3	Energy-related CO ₂ intensity — glass, pottery and building materials industry, t/million euro Energy-related CO ₂ emissions glass, pottery and building materials, kt divided by gross value added — glass, pottery and buildings material industry
INDUSTRY A1.4	Energy-related CO ₂ intensity — food, drink and tobacco industry, t/million euro Energy-related CO ₂ emissions from food, drink and tobacco industry, kt divided by gross value-added — food, drink and tobacco industry, million euro (EC95)
INDUSTRY A1.5	Energy-related CO ₂ intensity — paper and printing industry, t/million euro Energy-related CO ₂ emissions paper and printing, kt - Gross value-added — paper and printing industry, million euro (EC95)
HOUSEHOLDS A0	Specific CO ₂ emissions of households for space heating, t/m ² CO ₂ emissions of households for space heating divided by surface area of permanently occupied dwellings, million m ²
SERVICES B0	Specific CO ₂ emissions of commercial and institutional sector for space heating, kg/m ² CO ₂ emissions from space heating in commercial and institutional, kt divided by Surface area of services buildings, million m ²
TRANSPORT B0	Specific diesel related CO ₂ emissions of passenger cars, g/100 km
TRANSPORT B0	Specific petrol related CO ₂ emissions of passenger cars, g/100 km

ANNEX IV

POLICIES AND MEASURES INFORMATION IN THE AREA OF GREENHOUSE GAS EMISSIONS

Information to be included in the reports referred to in Article 16:

- (a) a description of their national system for reporting on policies and measures and for reporting on projections of anthropogenic greenhouse gas emissions by sources and removals by sinks pursuant to Article 32(1) or information on any changes made to that system where such a description has already been provided;
- (b) updates relevant to their long-term low emission strategies referred to in Article 14 and progress in implementing those strategies;
- (c) information on national policies and measures, or groups of measures, and on implementation of Union policies and measures, or groups of measures, that limit or reduce greenhouse gas emissions by sources or enhance removals by sinks, presented on a sectoral basis and organised by gas or group of gases (HFCs and PFCs) listed in Part 2 of Annex III. That information shall refer to applicable and relevant national or Union policies and shall include:
 - (i) the objective of the policy or measure and a short description of the policy or measure;
 - (ii) the type of policy instrument;
 - (iii) the status of implementation of the policy or measure or group of measures;
 - (iv) indicators to monitor and evaluate progress over time;
 - (v) quantitative estimates of the effects on emissions by sources and removals by sinks of greenhouse gases broken down into:
 - the results of ex ante assessments of the effects of individual or groups of policies and measures on the mitigation of climate change. Estimates shall be provided for a sequence of four future years ending with 0 or 5 immediately following the reporting year, with a distinction between greenhouse gas emissions covered by Directive 2003/87/EC, Regulation [] [ESR] and Regulation [] [LULUCF];

- the results of ex post assessments of the effects of individual or groups of policies and measures on the mitigation of climate change where available, with a distinction between greenhouse gas emissions covered by Directive 2003/87/EC, Regulation [] [ESR] and Regulation [] [LULUCF];
- (vi) estimates of the projected costs and benefits of policies and measures, as well as estimates of the realised costs and benefits of policies and measures;
- (vii) all references to the assessments of the costs and effects of national policies and measures, to information in the implementation of Union policies and measures that limit or reduce greenhouse gas emissions by sources or enhance removals by sinks and to the underpinning technical reports;
- (viii) an assessment of the contribution of the policy or measure to the achievement of the long-term low emission strategy referred to in Article 14;
- (d) information on planned additional national policies and measures envisaged with a view to limiting greenhouse gas emissions beyond their commitments under Regulation [] [ESR] and Regulation [] [LULUCF];
- (e) information regarding the links between the different policies and measures reported pursuant to point c and the way such policies and measures contribute to different projection scenarios.

ANNEX V

PROJECTIONS INFORMATION IN THE AREA OF GREENHOUSE GAS EMISSIONS

Information to be included in the reports referred to in Article 16:

- (a) projections without measures where available, projections with measures, and projections with additional measures;
- (b) total greenhouse gas projections and separate estimates for the projected greenhouse gas emissions for the emission sources covered by Directive 2003/87/EC and by Regulation [] [ESR] and the projected emissions by sources and removals by sinks under the Regulation [] [LULUCF];
- (c) the impact of policies and measures identified pursuant to Article 16(1)(a). Where such policies and measures are not included, this shall be clearly stated and explained;
- (d) results of the sensitivity analysis performed for the projections and information on the models and parameters used;
- (e) all relevant references to the assessment and the technical reports that underpin the projections referred to in Article 16(4).

ANNEX VI

INFORMATION ON NATIONAL ADAPTATION ACTIONS, FINANCIAL AND TECHNOLOGY SUPPORT PROVIDED TO DEVELOPING COUNTRIES, AUCTIONING REVENUE

Part 1

Reporting on Adaptation

Information to be included in the reports referred to in Article 17(1):

- (a) the main goals, objectives and institutional framework for adaptation;
- (b) climate change projections including weather extremes, climate-change impacts, assessment of climate vulnerability and risks and key climate hazards;
- (c) adaptive capacity;
- (d) adaptation plans and strategies;
- (e) institutional settings including vertical and horizontal governance and coordination, monitoring and evaluation systems;
- (f) progress made in implementation, including good practices and governance changes.

Part 2

Reporting on support to developing countries

Information to be included in the reports referred to in Article 17(2)(a):

- (a) information on financial support committed and provided to developing countries for the year X-1, including:
 - (i) quantitative information on public and mobilised financial resources by the Member State. The information on financial flows is to be based on the so-called 'Rio markers' for climate change mitigation-related support and climate change adaptation-related support and other tracking systems introduced by the OECD Development Assistance Committee;
 - (ii) qualitative methodological information explaining the method used to calculate the quantitative information, including an explanation of methodology for quantifying their data, and where relevant, also other information on the definitions and methodologies used to determine any figures, notably for information reported on mobilised financial flows;
 - (iii) available information on activities by the Member State related to public-funded technology transfer projects and capacity-building projects for developing countries under the UNFCCC, including whether the technology transferred or capacity-building project was used for mitigating or adapting to the effects of climate change, recipient country, amount of support provided, and type of technology transferred or capacity-building project;
- (b) information for the year X and subsequent years on the planned provision of support, including information on planned activities related to public-funded technology transfer projects or capacity building projects for developing countries under the UNFCCC and on technologies to be transferred and capacity-building projects, including whether the technology transferred or capacity-building project is intended for mitigating or adapting to the effects of climate change, recipient country, amount of support provided, and type of technology transferred or capacity-building project.

Part 3

Reporting on auctioning revenues

Information to be included in the reports referred to in Article 17(2)(b):

- (a) information on the use of revenues during the year X-1 generated by the Member State by auctioning allowances pursuant to Article 10(1) of Directive 2003/87/EC,

including information on such revenue that has been used for one or more of the purposes specified in Article 10(3) of that Directive, or the equivalent in financial value of that revenue, and the actions taken pursuant to that Article;

- (b) information on the use, as determined by the Member State, of all revenue generated by the Member State by auctioning aviation allowances pursuant to Article 3d(1) or (2) of Directive 2003/87/EC; that information shall be provided in accordance with Article 3d(4) of that Directive;

Auctioning revenue not disbursed at the time a Member State submits a report to the Commission pursuant to Article 17(2)(b) shall be quantified and reported in reports for subsequent years.

ANNEX VII

ADDITIONAL REPORTING OBLIGATIONS

Part 1

Additional reporting obligations in the area of renewable energy

The following additional information shall, unless otherwise stated, be included pursuant to Article 18(b)(6):

- (a) the functioning of the system of guarantees of origin for electricity, gas and heating and cooling from renewable energy sources, the levels of issuance and cancellation of guarantees of origin and the resulting annual national renewable energy consumption, as well as the measures taken to ensure the reliability and protection against fraud of the system;
- (b) aggregated information from the national databases referred to in Article 25(4) of [recast of Directive 2009/28/EC as proposed by COM(2016) 767] on biofuels, biogas produced from feedstock listed in Annex IX of [recast of Directive 2009/28/EC as proposed by COM(2016) 767], renewable transport fuels of non-biological origin, waste-based fossil fuels and electricity placed on the market by fuel suppliers, including information on the type of fuels, their energy content and, if applicable, their feedstock base and, if relevant, their greenhouse saving performance; where the national database do not contain actual values, Member States may use typical values or, where appropriate, default values given in part A and part B of Annex V of [recast of Directive 2009/28/EC as proposed by COM(2016) 767];
- (c) developments in the availability, origin and use of biomass resources for energy purposes;
- (d) changes in commodity prices and land use within the Member State associated with its increased use of biomass and other forms of energy from renewable sources;
- (e) the estimated excess production of energy from renewable sources which could be transferred to other Member States so that these comply with Article 3, paragraph 7 of the [recast of Directive 2009/28/EC as proposed by COM(2016) 767] and achieve the national contributions and trajectories referred to in Article 5, point (a)(2) of the same Directive;
- (f) the estimated demand for energy from renewable sources to be satisfied by means other than domestic production until 2030, including imported biomass feedstock;
- (g) the development and share of biofuels made from feedstocks listed in Annex IX of [recast of Directive 2009/28/EC as proposed by COM(2016) 767] including a

resource assessment focusing on the sustainability aspects relating to the effect of the replacement of food and feed products for biofuel production, taking due account of the principles of the waste hierarchy established in Directive 2008/98/EC and the biomass cascading principle, taking into consideration the regional and local economic and technological circumstances, the maintenance of the necessary carbon stock in the soil and the quality of the soil and the ecosystems;

- (h) the estimated impact of the production or use of biofuels, bioliquids and biomass fuels on biodiversity, water resources, water availability and quality, soils and air quality within the Member State;
- (i) risks or observed cases of fraud in the chain of custody of biofuels, bioliquids and biomass fuels;
- (j) information on how the share of biodegradable waste in waste used for producing energy has been estimated, and what steps have been taken to improve and verify such estimates;
- (k) electricity and heat generation from renewable energy in buildings (as defined in article 2(1) of Directive 2010/31/EU). This shall include disaggregated data on energy produced, consumed and injected into the grid by solar photovoltaic systems, solar thermal systems, biomass, heatpumps, geothermal systems, as well as all other decentralized renewables systems;
- (l) if applicable, the share of food-based and advanced biofuels, the share of renewable energy in district heating, as well as the renewable energy produced by cities and energy communities as defined by Article 22 of [recast of Directive 2009/28/EC as proposed by COM(2016) 767];
- (m) Primary supply of solid biomass (in 1000 m³, except 1)b)iii) in tons)
 - (1) Forest biomass used for energy production (domestic production, import and export)
 - (a) Primary biomass from forest used directly for energy production
 - i) Branches and tree tops (reporting is voluntary)
 - ii) Stumps (reporting is voluntary)
 - iii) Round wood (split into industrial roundwood and fuelwood)
 - (b) Forest-based industry co-products used directly for energy
 - i) Bark (reporting is voluntary)
 - ii) Chips, sawdust and other wood particles
 - iii) Black liquor and crude tall oil
 - (c) Post-consumer wood used directly for energy production
 - (d) Processed wood-based fuel, produced from feedstocks not accounted under points 1a), 1b) or 1c):
 - i) Wood charcoal
 - ii) Wood pellets and wood briquettes
 - (2) Agricultural biomass used for energy production (domestic production, import and export)

- (a) Energy crops for electricity or heat (including short rotation coppice)
 - (b) Agricultural crop residues for electricity or heat
- (3) Organic waste biomass for energy production (domestic production, import and export)
 - (a) Organic fraction of industrial waste
 - (b) Organic fraction of municipal waste
 - (c) Waste sludges
- (n) final energy consumption of solid biomass (amount of solid biomass used for energy production in the following sectors):
 - (1) Energy sector
 - (a) Electricity
 - (b) Combined heat and power
 - (c) Heat
 - (2) Industry sector internal (consumed and autoproduced electricity, CHP and heat)
 - (3) Direct final consumption residential
 - (4) Other

Part 2

Additional reporting obligations in the area of energy efficiency

In the area of energy efficiency, the following additional information shall be included pursuant to Article 19(c):

- (a) major legislative and non-legislative policies, measures, financing measures and programmes implemented in year X-2 and X-1 (with X as the year when the report is due) to achieve their objectives set under Article 4(b) which promote energy service markets, improve the energy performance of buildings, measures to utilise energy efficiency potentials of gas and electricity infrastructure and heating and cooling, improve information and qualification, other measures to promote energy efficiency;
- (b) energy savings achieved through Article 7 of Directive 2012/27/EU [as amended by proposal COM(2016)761] in years X-3 and X-2;
- (c) progress in each sector and reasons why energy consumption remained stable or was growing in year X-3 and X-2 in final energy consumption sectors;
- (d) total building floor area of the buildings with a total useful floor area over 250 m² owned and occupied by the Member States' central government that, on 1 January in year X-2 and X-1, which did not meet the energy performance requirements referred to in Article 5(1) of Directive 2012/27/EU;
- (e) total building floor area of heated and/or cooled buildings owned and occupied by the Member States' central government that was renovated in year X-3 and X-2 referred to in Article 5(1) of the Directive 2012/27/EU or the amount of energy savings in eligible buildings owned and occupied by their central government as referred to in Article 5(6) of Directive 2012/27/EU;

- (f) number of energy audits carried out in in year X-3 and X-2. In addition, the total number of large companies in their territory to which Article 8(4) of Directive 2012/27/EU is applicable and the number of energy audits carried out in those enterprises in the year X-3 and X-2;
- (g) applied national primary energy factor for electricity;
- (h) number and floor area of new and renovated nearly zero-energy buildings in year X-2 and X-1, as defined in Article 9 of the Directive 2010/31/EU;
- (i) the internet link to the website where the list or the interface of energy services providers referred to in point (c) of Article 18(1) of Directive 2012/27/EU can be accessible.

ANNEX VIII

UNION BIOENERGY SUSTAINABILITY REPORT

The EU bioenergy sustainability report on energy from biomass to be adopted biennially by the Commission together with the State of the Energy Union report pursuant to Article 29(2)(d), shall contain as a minimum the following information:

- (a) the relative environmental benefits and costs of different biofuels, bioliquids and biomass fuels, the effects of the Union's import policies thereon, the security of supply implications and the ways of achieving a balanced approach between domestic production and imports
- (b) the impact of the production and use of biomass on sustainability in the Union and in third countries, including impacts on biodiversity;
- (c) data and analysis of current and projected sustainable biomass availability and demand, including the impact of increased demand for biomass on biomass using sectors;
- (d) the technological development, availability and sustainability of biofuels made from feedstocks listed in Annex IX of [recast of Directive 2009/28/EC as proposed by COM(2016) 767], including an assessment of the effect of the replacement of food and feed products for biofuel production, taking due account of the principles of the waste hierarchy established in Directive 2008/98/EC and the biomass cascading principle, taking into consideration the regional and local economic and technological circumstances, the maintenance of the necessary carbon stock in the soil and the quality of soil and ecosystems;
- (e) information on, and analysis of, the available scientific research results regarding indirect land-use change in relation to all production pathways, accompanied by an assessment of whether the range of uncertainty identified in the analysis underlying the estimations of indirect land-use change emissions can be narrowed and the possible impact of Union policies, such as environment, climate and agricultural policies, can be factored in; and
- (f) in respect of both third countries and Member States that are a significant source of biofuels, bioliquids and biomass fuels consumed within the Union, on national measures taken to respect the sustainability criteria and greenhouse gas saving criteria set out in Article 26, paragraphs 2 to 7, of [recast of Directive 2009/28/EC as proposed by COM(2016) 767], for soil, water and air protection.

In reporting on greenhouse gas emission savings from the use of biomass, the Commission shall use the amounts reported by Member States in accordance to Annex IX, Part 1 (b),

including the provisional mean values of the estimated indirect land-use change emissions and the associated range derived from the sensitivity analysis as set out in Annex VIII of [recast of Directive 2009/28/EC as proposed by COM(2016) 767]. The Commission shall make data on the provisional mean values of the estimated indirect land-use change emissions and the associated range derived from the sensitivity analysis publicly available. In addition, the Commission shall evaluate whether and how the estimate for direct emission savings would change if co-products were accounted for using the substitution approach.

ANNEX IX

VOLUNTARY SCHEMES IN RESPECT OF WHICH THE COMMISSION HAS ADOPTED A DECISION ACCORDING TO ARTICLE 27(4) OF [RECAST OF DIRECTIVE 2009/28/EC AS PROPOSED BY COM(2016) 767]

The report on voluntary schemes in respect of which the Commission has adopted a decision according to Article 27(4) of [recast of Directive 2009/28/EC as proposed by COM(2016) 767], to be adopted biennially by the Commission together with the State of the Energy Union report pursuant to Article 29(2)(e), shall contain the Commission's assessment of, as a minimum, the following:

- (a) the independence, modality and frequency of audits, both in relation to what is stated on those aspects in the scheme documentation, at the time the scheme concerned was approved by the Commission, and in relation to industry best practice;
- (b) the availability of, and experience and transparency in the application of, methods for identifying and dealing with non-compliance, with particular regard to dealing with situations or allegations of serious wrongdoing on the part of members of the scheme;
- (c) transparency, particularly in relation to the accessibility of the scheme, the availability of translations in the applicable languages of the countries and regions from which raw materials originate, the accessibility of a list of certified operators and relevant certificates, and the accessibility of auditor reports;
- (d) stakeholder involvement, particularly as regards the consultation of indigenous and local communities prior to decision making during the drafting and reviewing of the scheme as well as during audits and the response to their contributions;
- (e) the overall robustness of the scheme, particularly in light of rules on the accreditation, qualification and independence of auditors and relevant scheme bodies;
- (f) market updates of the scheme, the amount of feedstocks and biofuels certified, by country of origin and type, the number of participants;
- (g) the ease and effectiveness of implementing a system that tracks the proofs of conformity with the sustainability criteria that the scheme gives to its member(s), such a system intended to serve as a means of preventing fraudulent activity with a view, in particular, to the detection, treatment and follow-up of suspected fraud and other irregularities and where appropriate, number of cases of fraud or irregularities detected;
- (h) options for entities to be authorised to recognise and monitor certification bodies;
- (i) criteria for the recognition or accreditation of certification bodies;
- (j) rules on how the monitoring of the certification bodies is to be conducted;

- (k) ways to facilitate or improve the promotion of best practice.

ANNEX X

NATIONAL INVENTORY SYSTEMS

Information referred to in Article 30 includes the following:

- (a) data and methods reported for activities and installations under Directive 2003/87/EC for the purpose of preparing national greenhouse gas inventories in order to ensure consistency of the reported greenhouse gas emissions under the Union's emissions trading scheme and in the national greenhouse gas inventories;
- (b) data collected through the reporting systems on fluorinated gases in the various sectors, set up pursuant to Article 20 of Regulation (EU) No 517/2014 for the purpose of preparing national greenhouse gas inventories;
- (c) emissions, underlying data and methodologies reported by facilities under Regulation (EC) No 166/2006 for the purpose of preparing national greenhouse gas inventories;
- (d) data reported under Regulation (EC) No 1099/2008;
- (e) data collected via the geographical tracking of land areas in the context of existing Union and Member State programmes and surveys including the LUCAS Land Use Cover Area frame Survey and the European Earth observation programme Copernicus.

ANNEX XI

CORRELATION TABLE

Regulation (EU) No 525/2013	This Regulation
Article 1	Article 1(1)
Article 2	—
Article 3	—
Article 4	Article 14
Article 5	Article 30(1); 30(2); 30(6); Annex X
Article 6	Article 30(3); 30(6)
Article 7	Article 23(2); 23(3); 23(5); 23(6); Annex III
Article 8	Article 23(1)(a); last subparagraph of Article 23(1); 23(6)
Article 9	Article 30(4); 30(5)
Article 10	Article 33
Article 11	—
Article 12	Article 32
Article 13	Article 16(1)(a); 16(3); 16(4); Annex IV
Article 14	Article 16(1)(b); 16(2); 16(3); 16(4); Annex V
Article 15	Article 17(1); Annex VI, Part 1

Article 16	Article 17(2)(a); Annex VI, Part 2
Article 17	Article 17(2)(b); 17(3); 17(4); Annex VI, Part 3
Article 18	Article 15(2)(e); the second subparagraph of Article 15(2)
Article 19	—
Article 20	—
Article 21	Article 25(1)(c); 25(4); 25(7)
Article 22	—
Article 23	Article 34(1)(d); 34(1)(e); 34(1)(f); 34(1)(g); 34(1)(h)
Article 24	Article 35
Article 25	—
Article 26	Article 37
Article 27	—
Article 28	Article 50
Article 29	—