

Reporting of used parameters and variables included in Annex 1, part 2, of the Energy Union Governance as agreed in trilogue

All parameters and variables highlighted in green are already currently requested under existing legislation (MNR, RES Directive, or Energy Efficiency Directive), see e.g. http://cdr.eionet.europa.eu/help-mm/MNR_projections_templates_2018.zip

All energy related parameters and variables highlighted in red might require to rely on complementary tools than standard energy system models

All variables highlighted in orange correspond to indicators to be computed on the basis of parameters and variables already available elsewhere in the excel file

1. General parameters and variables		Unit	Statistics					Projections					Comments MS	Source statistics	modelling output or exogenous assumption?	Comments Commission	
			2005	2010	2015	2020	2025	2030	2035	2040							
1	Population	million	16.31	16.57	16.90	17.30	17.60	17.80	18.00	18.10				CBS	Assumption		
2	GDP	EUR million	550883	639187	690008	762966	844260	903263	972580			Statistics based on real prices		CBS	Assumption		
3	Sectoral gross value added	EUR million	491394	574280	620835												
	Agriculture	EUR million	10235	11368	11898	12870	13508	14452	14574			Agriculture, forestry and fishing		CBS	Assumption		
	Construction	EUR million	26702	30186	28394	37395	38836	38840	39395			Construction, environmental services, water supply		CBS	Assumption		
	Services	EUR million	365346	437029	483452	598930	672031	725312	787975			Trade, transportation, commercial services, government, education		CBS	Assumption		
	Energy Sector	EUR million	18211	25223	20386	23452	23639	23485	22347			incl. Refinery sector		CBS	Assumption		
4	Number of households	EUR million	70900	70474	78705	90030	96246	101164	107849					CBS	Assumption		
	Households size	million inhabitants/household	7.1	7.4	7.7	8.0	8.2	8.4	8.5					CBS	Assumption		
5	Disposable income of households (yearly)	EUR	2.3	2.2	2.2	2.1	2.1	2.1	2.1					CBS	Assumption	Please specify the definition applied	
7	Number of passenger-kilometers	million pkm	182500	183500	186500									KM			
	Public road transport	million pkm	22500	23000	23000									KM			
	Private cars	million vehicle km	91500	94500	97000	109481	116529	124278	132068					KM	Assumption		
	Motorcycles	million pkm															
	Rail	million pkm	15200	17100	18500	20237	21418	22599						KM	Assumption		
	Aviation	million pkm															
	Inland navigation	million pkm															
8	Freight transport tonnes-kilometers	million tkm	122300	118600	128800									KM			
	Trucks	million tkm	58700	54100	57200	63592	65793	67995	70196					KM	Assumption		
	Rail	million tkm	5900	5900	6500	7414	8551	9687	10824					KM	Assumption		
	Inland navigation	million tkm	43100	46600	48500	55478	58048	60619	63189					KM	Assumption		
9	International Fuel prices	EUR/GJ or EUR/tonne														Please specify if Commission's proposal or other source was applied and in the latter case specify methodology	
	Oil	EUR 2016/GJ			8.10	8.80	13.00	17.30	18.30							Assumption	Please specify if Commission's proposal or other source was applied and in the latter case specify methodology
	Gas (NCV)	EUR 2016/GJ			6.60	5.40	7.60	9.80	10.40			Based on lower caloric value				Assumption	Please specify if Commission's proposal or other source was applied and in the latter case specify methodology
	Coal	EUR 2016/GJ			2.40	2.10	2.40	2.70	2.70							Assumption	Please specify if Commission's proposal or other source was applied and in the latter case specify methodology
10	Carbon price ETS sectors	EUR 2016/ton CO2	12.12	16.40	7.70	6.60	10.90	16.40	24.70							Assumption	Please specify if Commission's proposal or other source was applied and in the latter case specify methodology
11	Exchange rate to EUR and to US dollar	USD/Euro			1.11	1.16	1.11	1.11	1.11							Assumption	
12	Heating degree days			3321	2686	2710	2661	2612	2562			2512 Projections based on 2030 scenario KNMI (Royal Netherlands Met)		KNMI / CLO	Assumption	Please specify if Commission's proposal or other source was applied and in the latter case specify methodology	
13	Cooling degree days				112	119	126	133	139			145 Projections based on 2030 scenario KNMI (Royal Netherlands Met)		KNMI / CLO	Assumption	Please specify if Commission's proposal or other source was applied and in the latter case specify methodology	
14	Technology cost assumptions (see specific excel file circulated with technology cost assumptions as used in EU Reference Scenario 2016 for suggestions on what could be relevant to report)															Please specify if Commission's proposal or other source was applied and in the latter case specify methodology	
2. energy balances and indicators																	
2.1 energy supply																	
1	Production (incl. recovery of products)	Ktoe	62625	71398	48328	43234	33524	22745	19574					CBS	modelling output		
	Solids	Ktoe	0	0	0	0	0	0	0					CBS	modelling output		
	Oil	Ktoe	2560	1784	2380	1760	1160	907	624					CBS	modelling output		
	Natural gas	Ktoe	56186	64751	39534	32241	21733	12663	10735					CBS	modelling output		
	Nuclear	Ktoe	986	917	936	1049	1049	1047	0					CBS	modelling output		
	Renewable energy sources	Ktoe	1963	3052	4739	7317	8692	7239	7332					CBS	modelling output		
	Other	Ktoe	941	886	850	867	889	890	883					CBS	modelling output		
2	Net Imports (ktoe)	Ktoe	39720	31623	45811	46428	56315	64776	66097			Import - Export		CBS	modelling output		
	Solids	Ktoe	8216	9148	10461	8453	9136	8507	7456					CBS	modelling output		
	Oil	Ktoe	50564	46336	46026	44451	45941	48967	48180					CBS	modelling output		
	Natural gas	Ktoe	-20947	-24219	-10485	-8128	1055	7499	8332					CBS	modelling output		
	Electricity	Ktoe	1576	239	740	1313	-96	1519	1862					CBS	modelling output		
	Other	Ktoe	0	0	143	337	280	284	287					CBS	modelling output		
3	Import Dependency	%	39%	31%	50%	52%	63%	74%	77%			Net energy imports divided by gross inland energy consumption plus fuel supplied to internal					
4	Main import sources for energy carriers																
	Main country (please specify here) of origin of Electricity Purchases	% of total imports															
	1st main country (please specify here) of origin of Gas Purchases	% of total imports															
	2nd main country (please specify here) of origin of Gas Purchases	% of total imports															
	3rd main country (please specify here) of origin of Gas Purchases	% of total imports														If more countries to be reported please add rows	
5	Gross Inland Consumption	Ktoe	81836	84508	74556	74893	74569	71763	69415					CBS	modelling output		
	Solids	Ktoe	8087	7548	11013	8453	9136	8507	7456					CBS	modelling output		

	Oil		32662	31938	28544	31527	31938	32246	32703		Oil and petroleum products	CBS	modelling output	
	Natural gas	Ktoe	35325	40069	28526	24030	22582	20031	18903			CBS	modelling output	
	Nuclear	Ktoe	966	917	936	1049	1049	1047	0		Nuclear heat	CBS	modelling output	
	Electricity	Ktoe	1574	239	752	1313	-56	1520	1652			CBS	modelling output	
	Renewable energy forms	Ktoe	2259	3215	3583	7555	6972	7523	7608		Renewables, including biowaste and biolulids	CBS	modelling output	
	Other	Ktoe	891	836	915	867	889	890	893		Non-renewable waste	CBS	modelling output	
2.2. Electricity and heat														
	1 Gross electricity generation	GWhe	100769	116139	110087	99975	116139	95043	89744			CBS	modelling output	
	2 By fuel													
	Nuclear energy	GWhe	3997	3959	4078	4220	4220	4209	0			CBS	modelling output	
	Solids	GWhe	27957	26190	42473	27435	30031	25956	20562			CBS	modelling output	
	Oil (including refinery gas)	GWhe	332	48	96	0	0	0	0			CBS	modelling output	
	Gas (including derived gases)	GWhe	58208	73578	45881	30488	30139	19509	22443			CBS	modelling output	
	Biomass waste	GWhe	5277	7058	4930	13320	13511	6507	6320			CBS	modelling output	
	Hydro (pumping excluded)	GWhe	88	104	93	117	117	117	117			CBS	modelling output	
	Wind	GWhe	2057	3993	7590	19119	29556	26647	24689			CBS	modelling output	
	Solar	GWhe	34	59	1122	4975	8567	12089	15614			CBS	modelling output	
	Geothermal and other renewables	GWhe	0.00	0.00	0.00							CBS	modelling output	
	Other fuels (hydrogen, methanol)	GWhe	2809	3139	2864							CBS	modelling output	
	Share of power generation from combined heat and power generation in total electricity generation (CHP electricity generation divided by the total gross electricity generation, including the generation in pumped storage power stations	%	55%	52%	40%	34%	25%	24%	23%			CBS	modelling output	
	3 electricity generation, including the generation in pumped storage power stations	%												
	Share of heat generation from combined heat and power generation in total heat generation (CHP heat generation divided by the total heat for district heating)	%												
	Capacity electricity generation including retirements and new investments (note: split between retirements and new investments may not be straightforward to obtain with standard models. Complementary assumptions may need to be made)	GW	21.98	26.51	35.21	30.35	35.66	36.51	38.22			CBS	modelling output	
	4 obtain with standard models. Complementary assumptions may need to be made)													
	Nuclear energy	GW	0.45	0.51	0.51	0.48	0.48	0.48	0.00			CBS	modelling output	
	Solids	GW	9.47	8.86	11.16	4.64	4.64	4.64	3.41		Coal plants	CBS	modelling output	
	Oil (including refinery gas)	GW									Central + decentral plants	CBS	modelling output	
	Gas (including derived gases)	GW	10.68	14.41	10.55	12.25	11.04	9.52	9.57			CBS	modelling output	
	Biomass waste	GW				0.58	0.56	0.58	0.57			CBS	modelling output	
	Hydro (pumping excluded)	GW	0.04	0.04	0.04	0.04	0.04	0.04	0.04			CBS	modelling output	
	Wind	GW	1.22	2.24	3.39	6.19	8.51	7.28	6.51			CBS	modelling output	
	Solar	GW	0.05	0.09	1.52	6.06	10.26	14.26	18.12			CBS	modelling output	
	Geothermal and other renewables	GW										CBS	modelling output	
	Other fuels (hydrogen, methanol)	GW										CBS	modelling output	
	Heat generation from thermal power generation	GWhe												
	6 Heat generation from combined heat and power plants including industrial waste heat	GWhe												
	Cross-border interconnection capacities for electricity (the level of electricity interconnectivity in line with Article 44(1) and the relevant annex of the Energy Union Governance regulation) and their projected usage rates (note that such information may not be available in standard energy system models; 7 complementary tools or assumptions might be needed)													
	Germany	MW				4250	5000	5000	5000				Assumption	
	Belgium	MW				2400	3400	3400	3400				Assumption	
	Denmark	MW				700	700	700	700				Assumption	
	UK	MW				1000	1000	1000	1000				Assumption	
	Norway	MW				700	700	700	700				Assumption	
2.3. Transformation sector														
	1 Fuel inputs to Thermal Power Generation	Ktoe	19779	21915	19771	9934	9746	7317	6731		Total for the years 2005, 2010 and 2015 includes renewable energy	Eurostat	modelling output	
	Solids	Ktoe	4958	4669	7942	5013	5493	4746	3668			Eurostat	modelling output	
	Oil	Ktoe	545	386	354	203	202	212	212			Eurostat	modelling output	
	Gas	Ktoe	12115	14182	8720	4719	4051	2359	2851			Eurostat	modelling output	
	2 Fuel input to other conversion processes	Ktoe	65252	63955	65359	82145	59830	59314	57802			Eurostat	modelling output	
2.4. Energy consumption														
	1 Primary energy consumption	Ktoe	81836	84508	74556	74893	74569	71763	69415		Includes non-energetic energy consumption	CBS	modelling output	
	1 Final energy consumption	Ktoe	48564	50182	43026	42568	41755	40550	39052			CBS	modelling output	
	2 by sector													
	Industry	Ktoe	15391	14085	12873	13017	12854	12329	11246			CBS	modelling output	
	Residential	Ktoe	10746	12461	9556	8786	8450	8175	7842			CBS	modelling output	
	Tertiary	Ktoe	6936	7753	6671	6072	5730	5561	5493		Commercial and public services	CBS	modelling output	
	Transport	Ktoe	11379	11658	10385	10555	10526	10445	10638		Agriculture & forestry	CBS	modelling output	
	Agriculture	Ktoe	3657	3891	3475	3877	3808	3623	3431		Mainly fishery	CBS	modelling output	
	Other	Ktoe	375	334	285	361	386	398	413			CBS	modelling output	
	By transport activity, when available													
	Passenger transport	Ktoe												
	Freight transport	Ktoe												
	3 by fuel													
	Solids	Ktoe	506	516	482	100	103	103	92			CBS	modelling output	
	Oil	Ktoe	14684	15235	13683	13413	13557	13480	13877		Oil and petroleum products	CBS	modelling output	
	Gas	Ktoe	16577	19337	15054	15054	14691	14044	12307		The years 2005, 2010 and 2015 excludes gas consumption for un	CBS	modelling output	
	Electricity	Ktoe	8978	9265	8921	8717	8697	8673	8607			CBS	modelling output	
	Heat	Ktoe	5271	5178	4046	2249	1658	1402	1401		The years 2005, 2010 and 2015 includes unsold heat from CHP	CBS	modelling output	
	Renewable energy forms	Ktoe	521	561	735	2548	2566	2457	2598		Renewables, including biowaste and biolulids	CBS	modelling output	

	Other	ktoe	148	88	103	576	483	381	379		CBS	modelling output	
4.	Final non energy consumption	ktoe									CBS	modelling output	
5.	Primary energy intensity of the economy	ktoe/million euro	15140	16253	13507	13543	13819	14106	14408			modelling output	
6.	Final energy intensity by sector	ktoe/million euro of value added	0,15	0,13	0,11	0,10	0,09	0,08	0,07			calculation	
	Industry	ktoe/million euro of value added	0,22	0,20	0,16	0,14	0,13	0,12	0,10				
	Residential	toe/euro of value added											
	Tertiary	toe/euro of value added											
	Passenger transport	toe/million km											
	Freight transport	toe/million km											
2.5.	Prices												
	1 Electricity prices by type of using sector (residential, industry, tertiary)												
	residential	eur/MWh	178	174	184	170	195	199	212	222	Euro's 2015, total price including taxes	modelling output	
	industry	eur/MWh	95	92	78	73	91	91	101	111	Euro's 2015, total price including taxes. Average of 13 industrial states	modelling output	
	tertiary	eur/ktoe	1679954	1714843	1626165	1638958	1874756	1904412	2023039	2136140	Euro's 2015, total price including taxes. Average of commercial/retail	modelling output	
	2 National retail fuel prices (including taxes, per source and sector)												
	Diesel oil	eur/ktoe											
	Industry	eur/ktoe											
	Households	eur/ktoe											
	Transport private	eur/ktoe											
	Transport public	eur/ktoe											
	Gasoline	eur/ktoe											
	Transport private	eur/ktoe											
	Transport public	eur/ktoe											
	Natural gas	eur/ktoe											
	Industry	eur/ktoe	394085	380256	416024	392660	496341	601568	628381	654075	Euro's 2015, total price including taxes. Average of 13 industrial states	modelling output	
	Households	eur/ktoe	803892	755211	808522	913556	1058804	1207227	1244531	1277735	Euro's 2015, total price including taxes	modelling output	
2.6.	Investments												
	Energy-related investment costs for overall economy	% of GDP	1,0%	1,6%	2,0%								
	Energy-related investments costs for industry	% of value added											
2.7.	Renewables												
	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												
	1												
	RES in Gross Final Energy Consumption	%	2,5%	3,9%	5,8%	12%	16%	15%	15%		SHARES	modelling output	In line with RED recast
	RES H&C share	%	2,4%	3,1%	5,5%	9%	10%	10%	10%		SHARES	modelling output	In line with RED recast
	RES E share	%	6,3%	9,6%	11,1%	29%	44%	38%	39%		SHARES	modelling output	In line with RED recast
	RES T share	%	0,4%	3,3%	5,3%	8%	16%	19%	18%		SHARES	modelling output	In line with RED recast (as per Art 25 (1))
	Wind offshore	%	0,0%	3,0%	3,1%	6%	16%	19%	18%				
	Wind onshore	%	12,7%	14,6%	17,8%	17%	16%	15%	12%				
	Solar photovoltaic systems	%	0,2%	0,2%	3,4%	7%	10%	15%	20%				
	Solar heat systems	%	1,2%	1,1%	1,0%	1%	1%	1%	1%				
	Biomass	%	84,0%	77,5%	67,7%	60%	46%	37%	33%				
	Geothermal systems	%	0,0%	0,3%	2,1%	4%	3%	4%	4%				
	Heat pumps	%	1,2%	2,9%	4,7%	5%	6%	9%	12%				
	Hydro + geotermia	%	0,6%	0,4%	0,3%	0%	0%	0%	0%				
	(final consumption of renewable energy in transport as contribution to overall target)	%											In line with RED recast (as per Art 7 (4))
	Contribution of biofuels and biogas produced from feedstock listed in part B of Annex IX and consumed in transport	%											In line with RED recast
	Contribution of biofuels and biogas produced from feedstock listed in part A of Annex IX and consumed in transport	%											In line with RED recast
	Contribution from biofuels, biofuels and biomass fuels consumed in transport, produced from food or feed crops	%											In line with RED recast
	Contribution of other biofuels and consumed in transport	%											In line with RED recast
	Gross final consumption of RES for heating and cooling	ktoe	733	972	1419	2198	2436	2308	2339		SHARES	modelling output	In line with RED recast
	Gross final consumption of electricity from RES	ktoe	620	982	1094	2039	4355	3687	3810		SHARES	modelling output	In line with RED recast
	Gross final consumption of energy from RES in transport	ktoe	20	264	334	894	737	721	733		SHARES	modelling output	In line with RED recast
	Total Gross final consumption of RES	ktoe	1373	2208	2847	5931	7528	6716	6883		SHARES	modelling output	In line with RED recast
	Gross final consumption of waste heat and cold for heating and cooling	ktoe											If applicable for H&C obligation
	Waste heat and cold share in gross final consumption for heating and cooling	%											If applicable for H&C obligation
	Gross final consumption of RES from district heating and cooling	ktoe											In line with RED recast
	RES share from district heating and cooling in gross final consumption for heating and cooling	%											In line with RED recast
	Gross final consumption of waste heat and cold from district heating and cooling for heating and cooling	ktoe											In line with RED recast
	Waste heat and cold share from district heating and cooling in gross final consumption for heating and cooling	%											In line with RED recast
	Electricity and heat generation from renewable energy in buildings (as defined in Article 2(1) of Directive 2010/31/EU); this shall include, where available, 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)												
2	solar photovoltaic systems - produced	ktoe	3	6	86	307	546	849	1152			modelling output	Add additional rows if necessary
	solar thermal systems - produced	ktoe	20	27	27	56	50	57	50			modelling output	
	biomass - produced	ktoe	379	403	439	448	448	448	448			modelling output	
	heat pumps - produced	ktoe	21	68	140	305	462	611	853			modelling output	
	geothermal systems - produced	ktoe	0	2	52	210	254	254	254			modelling output	

Guidance for the template on reporting of used parameters and variables included in Annex 1, part 2, of the provisionally agreed Energy Union Governance

The aim of this excel file is to facilitate reporting of the quantitative parameters and variables under Annex I Part 2 in the indicated format

- All parameters and variables highlighted in green are already currently requested under existing legislation (MMR, RES Directive, or Energy Efficiency Directive), see e.g. http://cdr.eionet.europa.eu/help/mmr/MMR_projections_templates_2018.zip
- All energy related parameters and variables highlighted in red might require to rely on complementary tools than standard energy system models
- All variables highlighted in orange correspond to indicators to be computed on the basis of parameters and variables already available elsewhere in the excel file
- The request for historical data relates to data if and when used in modelling
- All monetary Euro values shall be expressed in constant 2016 prices.
- Elements in **red** font are meant to provide further precision to what is currently indicated in the template in the provisionally agreed Governance Regulation. They aim to provide additional guidance or specifications and should facilitate the better understanding of modelling results by the Commission. While they remain optional, their use is much encouraged.
- Please report the used values for the years 2005 to 2040 in five yearly steps, and if possible yearly for 2021 to 2030 (the latter indicated in the red font as not required in the template in the Governance regulation).
- Column T can be used for comments that MS wish to provide (e.g. explanation of different methodology, caveats or sources of projections)