

Annex 4. CO₂ reference approach and comparison with sectoral approach, and relevant information on the national energy balance

The basis for the Reference Approach calculation in Estonia are data gathered and processed annually by the Statistics Estonia (annual energy balance sheets) since the year 1990. These data are therefore official energy balance data. Reference Approach based on official statistical databases represents top-down data on import, export and stock change balance as published in the Energy Statistics Yearbooks and given in the energy database of the Statistics Estonia home page (www.stat.ee).

In the 2012 inventory, the difference of CO₂ emissions between RA and Sectoral Approach (SA) was 2.52%.

Differences in solid and liquid fuel consumption between RA and SA are caused by the fact that there is lot of secondary fuels used in final consumption (SA): shale oil, semi coke and oil shale gas – all made from the solid fuel – oil shale.

Information on the CO₂ reference approach, a comparison of that approach with the sectoral approach and relevant information on the national energy balance sheets are given in the NIR chapter 3.2.1 Comparison of the sectoral approach with the reference approach (CRF 1.AB).

Energy Balance 2010 (thousand tons) updated 02.01.2012

		<i>Coal</i>	<i>Coke*</i>	<i>Oil shale</i>	<i>Milled peat</i>	<i>Sod peat</i>	<i>Peat briquette</i>	<i>Fire-wood</i>	<i>Wood chips and wood waste</i>	<i>Wood chips</i>	<i>Wood waste</i>	<i>Briq. & pellets</i>	<i>Briquette</i>	<i>Pellets</i>	<i>Natural gas</i>	<i>Liquefied gas</i>
1	<i>In stocks at the beginning of the year</i>	17	1	2 395	72	101	19	32	124	83	41	32	6	26	0	1.2
2	<i>Production of primary energy [6]*</i>	0	0	17 933	325	36	0	1 818	2 527	1 466	1 061	427	48	379	0	0
3	<i>Production of converted energy</i>	0	22	0	0	0	84	0	0	0	0	0	0	0	0	0
4	<i>Imports</i>	71	0	0	0	0	0	0	0	0	0	12	0	12	701	7.9
5	<i>Resources of energy (1+2+3+4)</i>	88	23	20 328	397	137	103	1 850	2 653	1 550	1 103	471	54	417	701	9.1
6	<i>Exports</i>	0	21	0	0	81	64	0	0	0	0	391	0	391	0	0
7	<i>Marine bunkering</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	<i>In stocks at the end of the year</i>	28	3	2 439	86	14	28	24	64	32	32	471	54	417	0	1
9	<i>Supply of primary energy (5-6-7-8)</i>	60	0	17 889	311	42	11	1 826	2 589	1 518	1 071	50	46	4	701	8.1
10	<i>Gross inland consumption (11+12+14+16)</i>	60	0	17 888	311	42	11	1 826	2 589	1 518	1 071	50	46	4	701	8
11	<i>Consumption for conversion to other forms of energy</i>	5	0	17 672	311	42	1	121	1 971	1 517	454	6	2	4	530	0.2
	<i>for electricity generation</i>	0	0	12 974	42	10	0	0	438	429	9	0	0	0	44	0
	<i>for heat generation</i>	5	0	577	125	32	1	113	1 532	1 088	444	6	2	4	486	0.2
	<i>for conversion to other forms of fuels</i>	0	0	4 121	145	0	0	8	0	0	0	0	0	0	0	0
12	<i>Energy sector</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	14	0
13	<i>Losses</i>	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
14	<i>Consumption for non-energy purposes</i>	0	0	60	0	0	0	0	0	0	0	0	0	0	0	0
15	<i>Final consumption (calculated) (9-11-12-13-14)</i>	55	0	156	0	0	10	1 705	618	1	617	44	44	0	157	7.9
16	<i>Final consumption (observed) (16.1+16.2+16.3+16.4+16.5)</i>	55	0	156	0	0	10	1 705	618	1	617	44	44	0	157	7.8
16.1	<i>industry total</i>	47	0	156	0	0	0	5	10	0	10	0	0	0	46	2.7
	<i>iron and steel industry</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	<i>chemical industry</i>	0	0	0	0	0	0	1	0	0	0	0	0	0	4	1.7
	<i>production of non-ferrous metals</i>	1	0	0	0	0	0	0	0	0	0	0	0	0	2	0.1
	<i>production of other non-metallic mineral products</i>	45	0	156	0	0	0	1	0	0	0	0	0	0	19	0

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		<i>Heavy fuel oil</i>	<i>Shale oil (heavy fraction)</i>	<i>LFO and Diesel oil</i>	<i>LFO</i>	<i>Diesel oil</i>	<i>Motor gasoline</i>	<i>Aviation gasoline</i>	<i>Other biomass*</i>	<i>Other fuels*</i>	<i>Electricity*, GWh</i>	<i>Heat GWh</i>
1	<i>In stocks at the beginning of the year</i>	9	35	100	11	89	49	5	4	0	0	0
2	<i>Production of primary energy</i>	0	0	0	0	0	0	0	4	6	304	0
3	<i>Production of converted energy</i>	1	452	72	72	0	0	0	0	292	12 660	9 795
4	<i>Imports</i>	210	0	545	23	522	273	32	0	0	1 100	0
5	<i>Resources of energy (1+2+3+4)</i>	220	487	717	106	611	323	37	8	298	14 064	9 795
6	<i>Exports</i>	0	374	14	14	0	0	0	0	0	4 354	0
7	<i>Marine bunkering</i>	205	0	21	0	21	0	0	0	0	0	0
8	<i>In stocks at the end of the year</i>	9	32	76	7	69	47	0	5	0	0	0
9	<i>Supply of primary energy (5-6- 7-8)</i>	6	81	605	85	520	276	37	3	298	9 710	9 795
10	<i>Gross inland consumption (11+12+14+16)</i>	5	81	605	85	520	276	37	12	298	8 663	8 752
11	<i>Consumption for conversion to other forms of energy</i>	4	74	30	30	0	0	0	2	289	13	0
	<i>for electricity generation</i>	0	11	0	0	0	0	0	0	169	0	0
	<i>for heat generation</i>	4	63	30	30	0	0	0	2	120	13	0
	<i>for conversion to other forms of fuels</i>	0	0	0	0	0	0	0	0	0	0	0
12	<i>Energy sector</i>	0	0	15	0	15	0	0	0	9	1 754	496
13	<i>Losses</i>	0	0	0	0	0	0	0	0	0	1 047	1 042
14	<i>Consumption for non-energy purposes</i>	0	0	0	0	0	0	0	0	0	0	0
15	<i>Final consumption (calculated) (9-11-12-13-14)</i>	1	7	560	55	505	276	37	1	0	6 895	8 256
16	<i>Final consumption (observed) (16.1+16.2+16.3+16.4+16.5)</i>	1	7	560	55	505	276	37	10	0	6 896	8 256
16.1	<i>industry total</i>	1	7	31	7	24	1	0	10	0	2 092	2 128
	<i>iron and steel industry</i>	0	0	0	0	0	0	0	0	0	3	1
	<i>chemical industry</i>	0	0	0	0	0	0	0	0	0	251	182
	<i>production of non-ferrous metals</i>	0	0	0	0	0	0	0	0	0	10	1
	<i>production of other non- metallic mineral products</i>	0	4	0	0	0	0	0	10	0	210	41

		<i>Heavy fuel oil</i>	<i>Shale oil (heavy fraction)</i>	<i>LFO and Diesel oil</i>	<i>LFO</i>	<i>Diesel oil</i>	<i>Motor gasoline</i>	<i>Aviation gasoline</i>	<i>Other biomass*</i>	<i>Other fuels*</i>	<i>Electricity*, GWh</i>	<i>Heat GWh</i>
	<i>production of transport equipment</i>	0	0	0	0	0	0	0	0	0	40	37
	<i>machinery</i>	0	0	1	1	0	0	0	0	0	293	115
	<i>mining and quarrying</i>	0	0	4	1	3	0	0	0	0	15	2
	<i>food processing, beverages and tobacco</i>	0	0	1	1	0	0	0	0	0	278	377
	<i>pulp, paper and printing industry</i>	0	0	0	0	0	0	0	0	0	351	396
	<i>production of wood and wood products</i>	0	0	3	1	2	0	0	0	0	278	652
	<i>construction</i>	0	3	20	3	17	1	0	0	0	62	47
	<i>textile, leather and clothing industry</i>	0	0	0	0	0	0	0	0	0	122	105
	<i>other industries</i>	0	0	0	0	0	0	0	0	0	179	173
16.2	<i>agriculture and fishery</i>	0	1	63	6	57	0	0	0	0	189	124
16.3	<i>transport total</i>	0	0	400	37	363	83	37	0	0	57	28
	<i>railway transport</i>	0	0	50	35	15	0	0	0	0	5	0
	<i>road transport</i>	0	0	342	0	342	83	0	0	0	48	26
	<i>inland waterway transport</i>	0	0	8	2	6	0	0	0	0	4	0
	<i>air transport</i>	0	0	0	0	0	0	37	0	0	0	1
16.4	<i>commercial and public services</i>	0	0	17	2	15	0	0	0	0	2 534	1 817
16.5	<i>households</i>	0	0	50	4	46	192	0	0	0	2 023	4 159
	<i>Statistical difference (14-15)</i>	0	0	0	0	0	0	0	9	0	1	0

Due to rounding, the values of the aggregate data may differ from the sum

2009 Wood briquette and pellets data's are corrected on 22.09.2010

Data of Other biomass are added 02.01.2012

Production of primary energy: Biogas is other fuels*

Coke: Oil-shale coke (export)*

LFO and diesel oil: LFO and diesel oil import contain marine bunkering*

LFO: Light fuel oil is shale oil heating oil light fraction transformed on energy production*

Other biomass – straw, bone powder, animal waste

Other fuel: Shale oil gas and biogas, black liquor*

Electricity: Primary energy in hydro-electric and wind energy production*

Last-updated 2012-01-02

Energy Balance 2010 (TJ)

		Coal	Coke*	Oil shale	Milled peat	Sod peat	Peat briq.	Fire-wood	Wood chips and wood waste	Wood chips	Wood waste	Briq. & pellets	Briquette	Pellets	Natural gas	Liquefied gas
1	<i>In stocks at the beginning of the year</i>	458	27	21 554	698	1 210	306	245	866	578	288	542	96	446	0	52
2	<i>Production of primary energy*</i>	0	0	161401	3 251	428	0	13 745	17 692	10 265	7 427	7 232	813	6 418	0	0
4	<i>Imports</i>	1 918	8	0	0	0	0	0	0	0	0	0	0	0	23553	357
5	<i>Resources of primary energy (1+2+4)</i>	2 376	35	182955	3 949	1 638	306	13 990	18 558	10 843	7 715	7 774	909	6 864	23 553	409
6	<i>Exports</i>	0	585	0	0	969	1 020	0	0	0	0	6 439	0	6 439	0	0
7	<i>Marine bunkering</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	<i>In stocks at the end of the year</i>	762	78	21 952	851	170	444	183	446	224	222	489	126	363	0	46
9	<i>Supply of primary energy (5-6-7-8)</i>	1 614	-628	161003	3 098	499	-1158	13 807	18 112	10 619	7 493	846	783	62	23 553	363
10	<i>Consumption for conversion to other forms of energy</i>	129	0	159041	3 098	498	24	913	13 789	10 614	3 175	90	29	61	17 799	8
	<i>for electricity generation</i>	0	0	107681	414	115	0	0	3 065	3 000	65	0	0	0	1 475	0
	<i>for heat generation</i>	129	0	4 790	1 242	383	24	852	10 722	7 614	3 108	90	29	61	16 324	8
	<i>for conversion to other forms of fuels</i>	0	0	46 570	1442	0	0	61	2	0	2	0	0	0	0	0
3	<i>Production of converted energy</i>	0	639	0	0	0	1 338	0	0	0	0	0	0	0	0	0
11	<i>Energy sector</i>	0	0	0	0	0	0	2	0	0	0	0	0	0	474	1
12	<i>Losses</i>	0	0	10	0	0	0	0	0	0	0	0	0	0	7	0
13	<i>Consumption for non-energy purposes</i>	0	0	678	0	0	0	0	0	0	0	0	0	0	0	0
14	<i>Final consumption (calculated) (9+3-10-11-12-13)</i>	1 485	11	1 274	0	1	156	12 892	4 323	5	4 318	756	754	1	5 273	354
15	<i>Final consumption (observed) (15.1+15.2+15.3+15.4+15.5)</i>	1 486	11	1 275	0	1	155	12 895	4 323	4	4 319	751	751	0	5 275	351
15.1	<i>Industry total</i>	1 266	11	1 275	0	0	4	41	74	3	71	1	1	0	1 553	123
	<i>iron and steel industry</i>	0	11	0	0	0	0	1	0	0	0	0	0	0	4	0
	<i>chemical industry</i>	0	0	0	0	0	0	7	0	0	0	0	0	0	121	78
	<i>production of non-ferrous metals</i>	31	0	0	0	0	0	0	0	0	0	0	0	0	54	4
	<i>production of other non-metallic mineral products</i>	1 231	0	1 275	0	0	0	4	3	0	3	0	0	0	646	1

		<i>Coal</i>	<i>Coke*</i>	<i>Oil shale</i>	<i>Milled peat</i>	<i>Sod peat</i>	<i>Peat briq.</i>	<i>Fire-wood</i>	<i>Wood chips and wood waste</i>	<i>Wood chips</i>	<i>Wood waste</i>	<i>Briq. & pellets</i>	<i>Briquette</i>	<i>Pellets</i>	<i>Natural gas</i>	<i>Liquefied gas</i>
	<i>production of transport equipment</i>	1	0	0	0	0	1	2	0	0	0	0	0	0	4	0
	<i>machinery</i>	0	0	0	0	0	0	11	0	0	0	1	1	0	123	12
	<i>mining and quarrying</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	149	0
	<i>food processing, beverages and tobacco</i>	0	0	0	0	0	0	2	4	3	1	0	0	0	46	4
	<i>pulp, paper and printing industry</i>	0	0	0	0	0	0	1	0	0	0	0	0	0	79	1
	<i>production of wood and wood products</i>	0	0	0	0	0	0	7	66	0	66	0	0	0	205	5
	<i>construction</i>	1	0	0	0	0	3	3	0	0	0	0	0	0	100	4
	<i>textile, leather and clothing industry</i>	2	0	0	0	0	0	1	0	0	0	0	0	0	9	1
	<i>other industries</i>	0	0	0	0	0	0	2	1	0	1	0	0	0	13	13
15.2	<i>Agriculture and fishery</i>	0	0	0	0	0	0	34	0	0	0	0	0	0	40	7
15.3	<i>Transport total</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
	<i>railway transport</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	<i>road transport</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
	<i>inland waterway transport</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	<i>air transport</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15.4	<i>Commercial and public services</i>	11	0	0	0	0	1	107	6	0	6	5	5	0	1 383	52
15.5	<i>Households</i>	209	0	0	0	1	150	12 713	4 243	1	4 242	745	745	0	2 299	164
	<i>Statistical difference (14-15)</i>	-1	0	-1	1	0	1	-3	0	1	-1	5	3	1	-2	3

		<i>Heavy fuel oil</i>	<i>Shale oil (heavy fraction)</i>	<i>LFO and Diesel oil*</i>	<i>LFO*</i>	<i>Diesel oil</i>	<i>Motor gasoline</i>	<i>Aviation gasoline</i>	<i>Other fuel*</i>	<i>Total fuels</i>	<i>Electricity*</i>	<i>Heat</i>	<i>Total energy</i>
1	<i>In stocks at the beginning of the year</i>	345	1 356	4 221	463	3 758	2 173	206	23	34 282	0	0	34 282
2	<i>Production of primary energy [6]*</i>	0	0	0	0	0	0	0	237	203986	1 094	0	205 080
4	<i>Imports</i>	8 439	0	23 065	989	22 076	12 027	1 367	0	70 734	3 959	0	74 693
5	<i>Resources of primary energy (1+2+4)</i>	8 784	1 356	27 286	1 452	25 834	14 200	1 573	260	309002	5 053	0	314 055
6	<i>Exports</i>	0	14 659	592	592	0	0	0	0	24 264	15 675	0	39 939
7	<i>Marine bunkering</i>	8216	0	898	0	898	0	0	0	9 114	0	0	9 114
8	<i>In stocks at the end of the year</i>	362	1 271	3 237	305	2 932	2 062	0	53	32 406	0	0	32 406
9	<i>Supply of primary energy (5-6-7-8)</i>	206	-14 574	22 559	555	22 004	12 138	1 573	207	243218	-10 622	0	232 596
10	<i>Consumption for conversion to other forms of energy</i>	175	2 875	1 271	1 260	11	0	0	8 492	208202	48	0	208 250
	<i>for electricity generation</i>	1	407	3	1	2	0	0	4 965	118126	0	0	118 126
	<i>for heat generation</i>	174	2 468	1 268	1 259	9	0	0	3 527	42 001	48	0	42 049
	<i>for conversion to other forms of fuels</i>	0	0	0	0	0	0	0	0	48 075	0	0	48 075
3	<i>Production of converted energy</i>	21	17 734	3 049	3 049	0	0	0	8 554	31 335	45 576	35 260	112 171
11	<i>Energy sector</i>	0	5	662	11	651	4	0	264	1 412	6 317	1 788	9 517
12	<i>Losses</i>	2	1	1	0	1	0	0	0	21	3 768	3 751	7 540
13	<i>Consumption for non-energy purposes</i>	0	0	0	0	0	0	0	0	678	0	0	678
14	<i>Final consumption (calculated) (9+3-10-11-12-13)</i>	50	279	23 674	2 333	21 341	12 134	1 573	5	64 240	24 821	29 721	118 782
15	<i>Final consumption (observed) (15.1+15.2+15.3+15.4+15.5)</i>	43	282	23 667	2 330	21 337	12 139	1 574	139	64 367	24 825	29 720	118 912
15.1	<i>Industry total</i>	36	244	1 284	281	1 003	30	0	139	6 081	7 534	7 660	21 275
	<i>iron and steel industry</i>	0	0	0	0	0	0	0	0	16	9	3	28
	<i>chemical industry</i>	0	0	14	0	14	1	0	0	221	903	655	1 779
	<i>production of non-ferrous metals</i>	0	0	0	0	0	0	0	0	89	37	4	130
	<i>production of other non-metallic mineral products</i>	0	135	32	13	19	0	0	139	3 466	756	147	4 369
	<i>production of transport equipment</i>	3	0	5	0	5	0	0	0	16	145	132	293

		<i>Heavy fuel oil</i>	<i>Shale oil (heavy fraction)</i>	<i>LFO and Diesel oil*</i>	<i>LFO*</i>	<i>Diesel oil</i>	<i>Motor gasoline</i>	<i>Aviation gasoline</i>	<i>Other fuel*</i>	<i>Total fuels</i>	<i>Electricity*</i>	<i>Heat</i>	<i>Total energy</i>
	<i>machinery</i>	0	2	32	23	9	0	0	0	181	1 055	414	1 650
	<i>mining and quarrying</i>	0	0	169	33	136	0	0	0	318	53	6	377
	<i>food processing, beverages and tobacco</i>	13	0	43	39	4	0	0	0	112	1 002	1 357	2 471
	<i>pulp, paper and printing industry</i>	0	0	7	0	7	0	0	0	88	1 264	1 424	2 776
	<i>production of wood and wood products</i>	0	0	104	21	83	5	0	0	392	1 002	2 348	3 742
	<i>construction</i>	20	107	860	145	715	24	0	0	1 122	222	170	1 514
	<i>textile, leather and clothing industry</i>	0	0	1	1	0	0	0	0	14	440	377	831
	<i>other industries</i>	0	0	17	6	11	0	0	0	46	646	623	1 315
15.2	<i>Agriculture and fishery</i>	0	36	2 658	242	2 416	10	0	0	2 785	679	446	3 910
15.3	<i>Transport total</i>	0	0	16 899	1 561	15 338	3 653	1 574	0	22 131	206	100	22 437
	<i>railway transport</i>	0	0	2 125	1 491	634	0	0	0	2 125	17	1	2 143
	<i>road transport</i>	0	0	14 455	0	14 455	3 653	0	0	18 113	173	95	18 381
	<i>inland waterway transport</i>	0	0	319	70	249	0	0	0	319	14	0	333
	<i>air transport</i>	0	0	0	0	0	0	1 574	0	1 574	2	4	1 580
15.4	<i>Commercial and public services</i>	7	2	700	77	623	15	0	0	2 289	9 123	6 542	17 954
15.5	<i>Households</i>	0	0	2 126	169	1 957	8 431	0	0	31 081	7 283	14 972	53 336
	<i>Statistical difference (14-15)</i>	7	-3	7	3	4	-5	-1	0	-127	-4	1	-130

Due to rounding, the values of the aggregate data may differ from the sum

2009 Wood briquette and pellets data's are corrected on 23.09.2010

2002-2004 Natural gas data's are corrected on 21.10.2010

2009 Milled peat data's are corrected 31.12.2010

2009 Natural gas data's are corrected on 07.01.2011

2010. Other fuel data are corrected on 21.10.2011.

Production of primary energy: Biogas is other fuels*

Coke: Oil-shale coke*

LFO and diesel oil: LFO and diesel oil import contain marine bunkering*

LFO: Light fuel oil is on the row 'Production of converted energy' shale oil light fraction*

Other fuel: Shale oil gas and biogas, black liquor*

Electricity: Hydro-electric and wind energy*

Last-updated 2011-10-21