

Input DanishReference2030system

The EnergyPLAN model 7.20



Electricity demand (TWh/year):	Flexible demand	0.00			Capacities		Efficiencies		Regulation Strategy: Technical regulation no. 3				Fuel Price level:											
Fixed demand	49.00	Fixed imp/exp.	0.00	Group 2:		MW-e	MJ/s	elec.	Ther	KEOL regulation		23700		Capacities Storage		Efficiencies								
Electric heating	0.00	Transportation	0.00	CHP		1350	1647	0.41	0.50	Minimum Stabilisation share		0.30		MW-e		GWh								
Electric cooling	0.00	Total	49.00	Heat Pump		7	40	5.75		Stabilisation share of CHP		0.00		Hydro Pump:		0	0	0.40						
District heating (TWh/year)				Gr.1	Gr.2	Gr.3	Sum	Group 3:		Boiler		7500		0.86		Hydro Turbine:		0	0	0.40				
District heating demand				2.26	14.29	22.63	39.18	CHP		2000	2440	0.41	0.50	Minimum CHP gr 3 load		450 MW		Electrol. Gr.2:		0	0	0.40	0.50	
Solar Thermal				0.02	0.00	0.00	0.02	Heat Pump		0	0	3.50		Heat Pump maximum share		0.50		Electrol. Gr.3:		0	0	0.40	0.50	
Industrial CHP (CSHP)				0.00	0.00	1.73	1.73	Boiler		11300		0.86		Maximum import/export		0 MW		Electrol. trans.:		0	0	0.80		
Demand after solar and CSHP				2.24	14.29	20.90	37.43	Condensing		8000	0.52		Distr. Name :		Price_DKV_2005.txt		Ely. MicroCHP:		0	0	0.80			
Wind				6414 MW	20.87	TWh/year	0.00	Grid		Heatsstorage: gr.2: 40 GWh		gr.3: 10 GWh		Dependency factor		0.02	DKK/MWh pr. MW		CAES fuel ratio:		0.000			
Offshore Wind				0 MW	0	TWh/year	0.00	stabilisation		Fixed Boiler: gr.2: 2.5 Per cent		gr.3: 1.0 Per cent		Average Market Price		349	DKK/MWh		(TWh/year)		Coal	Oil	Ngas	Biomass
Photo Voltaic				0 MW	0	TWh/year	0.00	share		Electricity prod. from		CSHP		Waste (TWh/year)				Transport		0.00	69.20	0.00	0.00	
Wave Power				0 MW	0	TWh/year	0.00			Gr.1:		0.00		0.00				Household		0.01	6.72	9.05	7.29	
Hydro Power				0 MW	0	TWh/year				Gr.2:		0.00		0.00				Industry		3.37	26.92	18.19	5.18	
Geothermal				0 MW	0	TWh/year				Gr.3:		2.41		0.00				Various		0.00	3.01	19.73	0.00	

Output

District Heating											Electricity														Exchange					
Demand		Production									Consumption							Production							Balance				Payment	
Distr. heating	MW	Solar	CSHP	DHP	CHP	HP	ELT	Boiler	EH	Ba-lance	Elec. demand	Flexi-ble	Elec-trolyser	EH	Hydro Pump	Tur-bine	RES	Hy-dro	Geo-thermal	Waste+ CSHP	CHP	PP	Stab-Load %	Imp	Exp	CEEP	EPP	Imp	Exp	
MW	MW	MW	MW	MW	MW	MW	MW	MW	MW	MW	MW	MW	MW	MW	MW	MW	MW	MW	MW	MW	MW	MW	%	MW	MW	MW	MW	Million DKK	Million DKK	
January	7177	1	197	413	2945	40	0	3582	0	0	6305	0	7	0	0	0	2282	0	0	274	2413	1342	150	0	0	0	0	0	0	
February	7343	2	197	422	2410	40	0	4273	0	0	6237	0	7	0	0	0	2822	0	0	274	1975	1172	132	0	0	0	0	0	0	
March	6256	2	197	359	2602	40	0	3056	0	0	6004	0	7	0	0	0	2567	0	0	274	2133	1036	134	0	0	0	0	0	0	
April	5013	3	197	286	2367	40	0	2129	0	-9	5291	0	7	0	0	0	2324	0	0	274	1940	759	129	0	0	0	0	0	0	
May	3933	3	197	223	2364	40	0	1090	0	15	5162	0	7	0	0	0	2132	0	0	274	1937	825	131	0	0	0	0	0	0	
June	1782	3	197	100	1342	40	0	135	0	-34	5017	0	7	0	0	0	2354	0	0	274	1099	1296	126	0	0	0	0	0	0	
July	1782	4	197	99	1326	40	0	69	0	47	4574	0	7	0	0	0	1599	0	0	274	1087	1622	162	0	0	0	0	0	0	
August	1782	3	197	100	1368	40	0	131	0	-56	5263	0	7	0	0	0	2115	0	0	274	1121	1760	149	0	0	0	0	0	0	
September	2736	3	197	155	2006	40	0	303	0	32	5401	0	7	0	0	0	2187	0	0	274	1644	1302	138	0	0	0	0	0	0	
October	4076	2	197	234	1817	40	0	1777	0	10	5602	0	7	0	0	0	2973	0	0	274	1489	872	114	0	0	0	0	0	0	
November	5347	1	197	307	2178	40	0	2623	0	0	6054	0	7	0	0	0	2922	0	0	274	1785	1079	124	0	0	0	0	0	0	
December	6385	1	197	368	2887	40	0	2890	0	2	6056	0	7	0	0	0	2266	0	0	274	2366	1157	143	0	0	0	0	0	0	
Average	4460	2	197	255	2135	40	0	1831	0	1	5578	0	7	0	0	0	2376	0	0	274	1749	1186	136	0	0	0	0	0	Average price (DKK/MWh)	
Maximum	12535	28	197	723	4088	40	0	9246	0	2084	8603	0	7	0	0	0	5639	0	0	274	3350	5062	289	0	0	0	0	0	35	
Minimum	1561	0	197	76	549	40	0	26	0	-2018	2795	0	7	0	0	0	0	0	0	274	450	0	100	0	0	0	0	0	0	
Total for the whole year																									Million DKK					
TWh/year	39.18	0.02	1.73	2.24	18.75	0.35	0.00	16.08	0.00	0.01	49.00	0.00	0.06	0.00	0.00	0.00	20.87	0.00	0.00	2.41	15.37	10.42	0.00	0.00	0.00	0.00	0	0		

FUEL BALANCE (TWh/year):																				Imp/Exp Corrected			CO2 emission (Mt):		
DHP	CHP2	CHP3	Boiler2	Boiler3	PP	Geo-th.	Hydro	Elc.ly.s	Waste	CAES	Wind	Offsh.	PV	Wave	Solar.Th	Transp.	househ.	Industry	Various	Total	Imp/Exp	Netto	Total	Netto	
Coal	0.04	0.98	2.23	0.17	0.19	7.37	-	-	-	-	-	-	-	-	-	-	-	0.01	3.37	-	14.36	0.00	14.36	4.91	4.91
Oil	0.83	0.22	0.50	3.75	4.25	0.56	-	-	-	-	-	-	-	-	-	69.20	-	6.72	26.92	3.01	115.95	0.00	115.95	30.89	30.89
N.Gas	0.67	4.55	10.32	3.01	3.40	11.86	-	-	-	-	-	-	-	-	-	-	-	9.05	18.19	19.73	80.78	0.00	80.78	16.49	16.49
Biomass	1.06	7.35	11.37	1.65	2.26	0.20	-	-	-	-	-	-	-	-	-	-	-	7.29	5.18	-	36.36	0.00	36.36	0.00	0.00
Renewable	-	-	-	-	-	-	-	-	-	-	20.87	-	-	-	0.02	-	-	-	-	-	20.89	0.00	20.89	0.00	0.00
H2 etc.	-	0.00	0.00	0.00	0.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00	0.00	0.00	0.00	0.00
Geothermal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00	0.00	0.00	0.00	0.00
Total	2.60	13.10	24.42	8.58	10.10	19.98	-	-	-	-	20.87	-	-	-	0.02	69.20	23.07	53.66	22.74	268.34	0.00	268.34	52.29	52.29	



District Heating Production																														
Gr.1					Gr.2										Gr.3										RES specification					
District heating	Solar	CSHP	DHP		District heating	Solar	CSHP	CHP	HP	ELT	Boiler	EH	Storage	Bal-	District heating	Solar	CSHP	CHP	HP	ELT	Boiler	EH	Storage	Bal-	RES1	RES2	RES3	RES4	Total	
MW	MW	MW	MW		MW	MW	MW	MW	MW	MW	MW	MW	MW	MW	MW	MW	MW	MW	MW	MW	MW	MW	MW	MW	Wind	Offsho	Photo	'Wave	I	er
																									MW	MW	MW	MW	MW	
January	414	1	0	413	2618	0	0	1040	40	0	1537	0	19452	0	4146	0	197	1904	0	0	2044	0	4406	0	2282	0	0	0	2282	
February	424	2	0	422	2678	0	0	773	40	0	1866	0	19452	0	4241	0	197	1637	0	0	2407	0	4406	0	2822	0	0	0	2822	
March	361	2	0	359	2282	0	0	863	40	0	1378	0	19452	0	3614	0	197	1739	0	0	1678	0	4406	0	2567	0	0	0	2567	
April	289	3	0	286	1829	0	0	776	40	0	1023	0	17588	-10	2896	0	197	1592	0	0	1106	0	3664	1	2324	0	0	0	2324	
May	227	3	0	223	1435	0	0	821	40	0	550	0	18650	24	2272	0	197	1543	0	0	540	0	4035	-8	2132	0	0	0	2132	
June	103	3	0	100	650	0	0	558	40	0	86	0	17835	-34	1030	0	197	783	0	0	49	0	6578	1	2354	0	0	0	2354	
July	103	4	0	99	650	0	0	543	40	0	29	0	15639	38	1030	0	197	783	0	0	40	0	4196	9	1599	0	0	0	1599	
August	103	3	0	100	650	0	0	568	40	0	88	0	15187	-46	1030	0	197	800	0	0	43	0	4028	-10	2115	0	0	0	2115	
September	158	3	0	155	998	0	0	786	40	0	152	0	21197	20	1581	0	197	1220	0	0	151	0	5881	12	2187	0	0	0	2187	
October	235	2	0	234	1486	0	0	518	40	0	910	0	10642	19	2354	0	197	1299	0	0	867	0	5725	-9	2973	0	0	0	2973	
November	308	1	0	307	1950	0	0	669	40	0	1242	0	11119	0	3089	0	197	1510	0	0	1382	0	7543	0	2922	0	0	0	2922	
December	368	1	0	368	2329	0	0	1023	40	0	1265	0	11617	0	3688	0	197	1864	0	0	1625	0	6968	2	2266	0	0	0	2266	
Average	257	2	0	255	1627	0	0	745	40	0	841	0	16465	1	2576	0	197	1389	0	0	990	0	5149	0	2376	0	0	0	2376	
Maximum	723	28	0	723	4572	0	0	1647	40	0	4027	0	40000	1302	7240	0	197	2440	0	0	5219	0	10000	1624	5639	0	0	0	5639	
Minimum	90	0	0	76	569	0	0	0	40	0	0	0	0	-1119	902	0	197	549	0	0	26	0	0	-1117	0	0	0	0	0	
Total for the whole year																														
TWh/year	2.26	0.02	0.00	2.24	14.29	0.00	0.00	6.55	0.35	0.00	7.38	0.00	0.01		22.63	0.00	1.73	12.20	0.00	0.00	8.70	0.00	0.00		20.87	0.00	0.00	0.00	20.87	

ANNUAL COSTS (Million DKK)

Total Fuel =	61349
Coal =	803
FuelOil =	8688
Gasoil/Diesel=	13572
Petrol/JP =	17399
Ngas =	15228
Biomass =	5659
Waste =	0
Maginal operation costs =	482
Total Electricity exchange =	0
Import =	0
Export =	0
Bottleneck =	0
Fixed imp/ex=	0
Total CO2 emission costs =	7843
Total variable costs =	69674
Fixed operation costs =	2817
Annual Investment costs =	8433
TOTAL ANNUAL COSTS =	80924