Input AlternativeWithLargeScaleHeatPumps — The EnergyPLAN model 7.20

Electricity demand (TWh/year):		Flexible demand	0.00
Fixed demand	49.00	Fixed imp/exp.	0.00
Electric heating	0.00	Transportation	0.00
Electric cooling	0.00	Total	49.00

District heating (TWh/year)	Gr.1	Gr.2	Gr.3	Sum
District heating demand	2.26	14.29	22.63	39.18
Solar Thermal	0.02	0.00	0.00	0.02
Industrial CHP (CSHP)	0.00	0.00	1.73	1.73
Demand after solar and CSHP	2.24	14.29	20.90	37.43

Wind	6414	MW	21.67	TWh/year	0.00	Grid
Offshore Wind	0	MW	0	TWh/year	0.00	stabili-
Photo Voltaic	0	MW	0	TWh/year	0.00	sation
Wave Power	0	MW	0	TWh/year	0.00	share
Hydro Power	0	MW	0	TWh/year		
Geothermal	0	MW	0	TWh/year		

	Capacities MW-e	MJ/s	Efficiencies elec.	Ther	COP
Group 2:					
CHP	1350	1647	0.41	0.50	
Heat Pump	207	741			3.58
Boiler		7500		0.86	
Group 3:					
CHP	2000	2440	0.41	0.50	
Heat Pump	250	875			3.50
Boiler		11300		0.86	
Condensing	8000		0.52		

Heatstorage:	gr.2:	40	GWh	gr.3:	10	GWh
Fixed Boiler:	gr.2:	2.5	Per cent	gr.3:	1.0	Per cent

Electricity prod. from	CSHP	Waste (TWh/year)
Gr.1:	0.00	0.00
Gr.2:	0.00	0.00
Gr.3:	2.41	0.00

Regulation Strategy:	Technical regulation no. 3		
KEOL regulation	23700		
Minimum Stabilisation share	0.30		
Stabilisation share of CHP	0.00		
Minimum CHP gr 3 load	450	MW	
Heat Pump maximum share	0.50		
Maximum import/export	0	MW	

Distr. Name :	Price_DKV_2005.txt	
Addition factor	60.00	DKK/MWh
Multiplication factor	1.04	
Dependency factor	0.02	DKK/MWh pr. MW
Average Market Price	349	DKK/MWh

Fuel Price level:

	Capacities MW-e	Storage GWh	Efficiencies elec.	Ther.
Hydro Pump:	0	0	0.40	
Hydro Turbine:	0		0.40	
Electrol. Gr.2:	0	0	0.40	0.50
Electrol. Gr.3:	0	0	0.40	0.50
Electrol. trans.:	0	0	0.80	
Ely. MicroCHP:	0	0	0.80	
CAES fuel ratio:		0.000		

(TWh/year)	Coal	Oil	Ngas	Biomass
Transport	0.00	69.20	0.00	0.00
Household	0.01	6.72	9.05	7.29
Industry	3.37	26.92	18.19	5.18
Various	0.00	3.01	19.73	0.00

Output

	District Heating: Demand	Production									Electricity: Consumption						Production								Balance					Exchange	
	Distr. heating MW	Solar MW	Waste+ CSHP MW	DHP MW	CHP MW	HP MW	ELT MW	Boiler MW	EH MW	Balance MW	Elec. demand MW	Flexible MW	HP MW	Electrolyser MW	EH MW	Hydro Pump MW	Turbine MW	RES MW	Hydro MW	Geothermal MW	Waste+ CSHP MW	CHP MW	PP MW	Stab-Load %	Imp MW	Exp MW	CEEP MW	EEP MW	Payment Imp	Payment Exp
																													Million DKK	
January	7177	1	197	413	3119	1584	0	1863	0	0	6305	0	448	0	0	0	0	2356	0	0	274	2557	1566	156	0	0	0	0	0	0
February	7343	2	197	422	2599	1594	0	2527	0	2	6237	0	451	0	0	0	0	2944	0	0	274	2130	1339	137	0	0	0	0	0	0
March	6256	2	197	359	2819	1479	0	1400	0	0	6004	0	418	0	0	0	0	2665	0	0	274	2310	1172	139	0	0	0	0	0	0
April	5013	3	197	286	2605	1122	0	794	0	6	5291	0	317	0	0	0	0	2425	0	0	274	2135	774	130	0	0	0	0	0	0
May	3933	3	197	223	2394	866	0	233	0	16	5162	0	245	0	0	0	0	2231	0	0	274	1962	939	132	0	0	0	0	0	0
June	1782	3	197	100	1099	394	0	25	0	-35	5017	0	111	0	0	0	0	2411	0	0	274	901	1542	138	0	0	0	0	0	0
July	1782	4	197	99	1180	291	0	12	0	-1	4574	0	82	0	0	0	0	1640	0	0	274	967	1775	169	0	0	0	0	0	0
August	1782	3	197	100	1108	365	0	17	0	-7	5263	0	102	0	0	0	0	2170	0	0	274	908	2013	160	0	0	0	0	0	0
September	2736	3	197	155	1783	576	0	21	0	2	5401	0	162	0	0	0	0	2268	0	0	274	1461	1560	148	0	0	0	0	0	0
October	4076	2	197	234	1920	1155	0	532	0	37	5602	0	326	0	0	0	0	3132	0	0	274	1573	949	115	0	0	0	0	0	0
November	5347	1	197	307	2368	1307	0	1177	0	-10	6054	0	370	0	0	0	0	3063	0	0	274	1940	1145	126	0	0	0	0	0	0
December	6385	1	197	368	3071	1353	0	1388	0	8	6056	0	383	0	0	0	0	2343	0	0	274	2517	1304	148	0	0	0	0	0	0
Average	4460	2	197	255	2172	1006	0	827	0	2	5578	0	284	0	0	0	0	2467	0	0	274	1780	1341	141	0	0	0	0	Average price	
Maximum	12535	28	197	723	4088	1616	0	7454	0	2111	8603	0	457	0	0	0	0	5940	0	0	274	3350	5421	294	0	0	0	0	(DKK/MWh)	
Minimum	1561	0	197	76	549	66	0	0	0	-1576	2795	0	19	0	0	0	0	0	0	0	274	450	0	100	0	0	0	0	112	0
Total for the whole year																													Million DKK	
TWh/year	39.18	0.02	1.73	2.24	19.08	8.83	0.00	7.26	0.00	0.01	49.00	0.00	2.50	0.00	0.00	0.00	0.00	21.67	0.00	0.00	2.41	15.64	11.78		0.00	0.00	0.00	0.00	0	0

FUEL BALANCE (TWh/year):

	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 Corrected Imp/Exp	Imp/Exp Corrected Netto	CO2 emission (Mt): Total	CO2 emission (Mt): Netto
Coal	0.04	0.96	2.36	0.06	0.05	8.34	-	-	-	-	-	-	-	-	-	-	-	0.01	3.37	-	15.19	0.00	15.19	5.19	5.19
Oil	0.83	0.21	0.53	1.30	1.15	0.63	-	-	-	-	-	-	-	-	-	-	69.20	6.72	26.92	3.01	110.51	0.00	110.51	29.44	29.44
N.Gas	0.67	4.43	10.96	1.04	0.92	13.42	-	-	-	-	-	-	-	-	-	-	-	9.05	18.19	19.73	78.41	0.00	78.41	16.01	16.01
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	-	-	-	-	-	-	-	-	-	-	-	21.67	-	-	-	0.02	-	-	-	-	21.69	0.00	21.69	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	12.95	25.22	4.05	4.39	22.59	-	-	-	-	-	21.67	-	-	-	0.02	69.20	23.07	53.66	22.74	262.16	0.00	262.16	50.64	50.64

23-October-2008

District Heating Production

	Gr.1				Gr.2									Gr.3									RES specification				
	District heating MW	Solar MW	CSHP MW	DHP MW	District heating MW	Solar MW	CSHP MW	CHP MW	HP MW	ELT MW	Boiler MW	EH MW	Stor-age MW	Ba-lance MW	District heating MW	Solar MW	CSHP MW	CHP MW	HP MW	ELT MW	Boiler MW	EH MW	Stor-age MW	Ba-lance MW	RES1 Wind MW	RES2 Offsho MW	RES3 Photo MW	RES4 Wave MW	Total er MW
January	414	1	0	413	2618	0	0	1114	717	0	787	0	21639	0	4146	0	197	2005	867	0	1076	0	9864	0	2356	0	0	0	2356
February	424	2	0	422	2678	0	0	846	725	0	1107	0	21613	0	4241	0	197	1754	869	0	1420	0	9706	2	2944	0	0	0	2944
March	361	2	0	359	2282	0	0	950	662	0	670	0	21450	0	3614	0	197	1869	817	0	730	0	8972	0	2665	0	0	0	2665
April	289	3	0	286	1829	0	0	869	512	0	452	0	18066	-5	2896	0	197	1736	610	0	342	0	4584	11	2425	0	0	0	2425
May	227	3	0	223	1435	0	0	873	414	0	125	0	20542	23	2272	0	197	1521	452	0	108	0	4157	-7	2231	0	0	0	2231
June	103	3	0	100	650	0	0	358	296	0	25	0	27846	-29	1030	0	197	741	98	0	0	0	9953	-6	2411	0	0	0	2411
July	103	4	0	99	650	0	0	432	207	0	12	0	28797	-1	1030	0	197	749	84	0	0	0	10000	0	1640	0	0	0	1640
August	103	3	0	100	650	0	0	362	277	0	17	0	29394	-7	1030	0	197	745	88	0	0	0	10000	0	2170	0	0	0	2170
September	158	3	0	155	998	0	0	631	349	0	18	0	29321	0	1581	0	197	1152	227	0	3	0	9106	2	2268	0	0	0	2268
October	235	2	0	234	1486	0	0	567	561	0	333	0	12893	25	2354	0	197	1353	594	0	199	0	5584	11	3132	0	0	0	3132
November	308	1	0	307	1950	0	0	737	591	0	624	0	14995	-1	3089	0	197	1631	716	0	554	0	4592	-9	3063	0	0	0	3063
December	368	1	0	368	2329	0	0	1099	605	0	623	0	15759	2	3688	0	197	1971	748	0	765	0	2440	6	2343	0	0	0	2343
Average	257	2	0	255	1627	0	0	737	492	0	397	0	21853	1	2576	0	197	1435	513	0	430	0	7405	1	2467	0	0	0	2467
Maximum	723	28	0	723	4572	0	0	1647	741	0	3326	0	40000	975	7240	0	197	2440	875	0	4127	0	10000	1136	5940	0	0	0	5940
Minimum	90	0	0	76	569	0	0	0	41	0	0	0	0	-1119	902	0	197	549	26	0	0	0	0	-885	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	6.47	4.32	0.00	3.49	0.00		0.01	22.63	0.00	1.73	12.61	4.51	0.00	3.78	0.00		0.01	21.67	0.00	0.00	0.00	21.67

ANNUAL COSTS (Million DKK)

Total Fuel =		59836
Coal =	850	
FuelOil =	7584	
Gasoil/Diesel=	13572	
Petrol/JP =	17399	
Ngas =	14773	
Biomas =	5659	
Waste =	0	
Maginal operation costs =		504
Total Electricity exchange =		0
Import =	0	
Export =	0	
Bottleneck =	0	
Fixed imp/ex=	0	
Total CO2 emission costs =		7596
Total variable costs =		67936
Fixed operation costs =		2835
Annual Investment costs =		9038
TOTAL ANNUAL COSTS =		79809