Country: **Denmark**

Total number of plants: 16
with co-firing: 3
fossil fuels for co-firing:

Locations (+database No.):

Assens (26), Grenaa CHP plant (27), Harboore (28), Haslev (29), Herning (30), Hjordkaer (31), Hogild (32), Holstebro (33), Koege (34), Koege (35), Lyngby (36), Rudkobing (37), Sakskobing (38), Salling (39), Slagelse (40), Vordingborg (41).

Year of construction	No.	
before 1995	10	62 %
1995 - 2000	6	38 %
after 2000	0	0 %
unknown	0	0 %

Type of power generation	No.		**Fuels**	No.*	
Steam turbine:	12	75 %	Woodchips (forest residues):	8	33 %
Steam engine:	0	0 %	Woodchips (saw industry):	1	4 %
Organic rankine cycle:	0	0 %	Paper sludge:	0	0 %
Stirling engine:	2	12 %	Waste wood:	0	0 %
Hot air engine:	0	0 %	Bark:	0	0 %
Gas engine:	2	12 %	Peat:	0	0 %
Gas turbine:	0	0 %	Straw:	8	33 %
Other (or n.a.):	0	0 %	Other (or n.a.):	7	29 %

Character of plants	No.		**Electric power**	No.	
Testing plants:	2	12 %	<1MW:	4	25 %
Pilote plants:	1	6 %	1MW - <5MW:	3	19 %
Demonstration plants:	1	6 %	5MW - 20MW:	8	50 %
Commercial plants:	12	75 %	>20MW:	1	6 %
unknown:	0	0 %	unknown:	0	0 %

*) double counting possible because some CHP plants might use more than one fuel

Name: Assens CHP plant

Database No. 26

Basic Info	
Country:	Denmark
Location:	Assens
Character of plant:	Commercial plant
Owner:	Assens Fjernvarme
Contact Person:	(Assens district heating compagny)
Telephone:	+45 64 71 10 24
Fax:	n.a.
email:	www.assensfjernvarme.dk
webpage:	n.a.
Year of construction:	1999

Technology			**Fuel**		
Type of power generation:	Steam turbine		Total fuel input:	n.a.	t/a
Electric power:	5	MW_{el}	Tot. lower heating value:	2,8	kWh/kg
Thermal power:	10,3	MW_{th}	Moisture content:	20-40	% wet
Co-firing:	N				
Fuel conversion:	Gasification				
Annual production electricity:	24	GWh/a	Type of fuel 1:	Woodchips (forest residues)	
Annual production heat:	67	GWh/a	Share of fuel 1:	100	%
Electric efficiency:	27	%	Input of fuel 1:	n.a.	t/a
Thermal efficiency:	60	%			
Total efficiency:	87	%	Type of fuel 2:	-	
Ratio electricity/ heat:	0,45		Share of fuel 2:	-	%
Fuel power:	n.a.	MW_{fuel}	Input of fuel 2:	-	t/a
Boiler (if steam technology)					
Steam mass flow:	19	t/h	Type of fuel 3:	-	
Steam temperature:	525	°C	Share of fuel 3:	-	%
Steam pressure:	77	bar	Input of fuel3:	-	t/a

Costs			**Emissions**		
Investment costs:	n.a.	Mio €	CO:	n.a.	mg/Nm^3
Spec.investment costs (elec):	n.a.	Mio€/MW_{el}	NO_x:	n.a.	mg/Nm^3
Fuel costs:	n.a.	€/t	Particles:	n.a.	mg/Nm^3
Subsidies:	3,3	Mio €	C_xH_y:	n.a.	mg/Nm^3
Number of employes:	n.a.		SO_2:	n.a.	mg/Nm^3

Source:

Henrik Ortenblad/Energistyrelsen

n.a.... not available

Name: Grenaa CHP plant

Database No. 27

Basic Info	
Country:	Denmark
Location:	Grenaa CHP plant
Character of plant:	Commercial plant
Owner:	Elsam I/S
Contact Person:	0
Telephone:	+45 87 49 17 00
Fax:	n.a.
email:	n.a.
webpage:	www.elsam.dk
Year of construction:	1991

Technology			**Fuel**		
Type of power generation:	Steam turbine		Total fuel input:	n.a.	t/a
Electric power:	20	MW_{el}	Tot. lower heating value:	4,2	kWh/kg
Thermal power:	32	MW_{th}	Moisture content:	15	% wet
Co-firing:	Y				
Fuel conversion:	Combustion				
Annual production electricity:	87	GWh/a	Type of fuel 1:	Straw	
Annual production heat:	100,55	GWh/a	Share of fuel 1:	45	%
Electric efficiency:	18	%	Input of fuel 1:	n.a.	t/a
Thermal efficiency:	n.a.	%			
Total efficiency:	-	%	Type of fuel 2:	Coal	
Ratio electricity/ heat:	-		Share of fuel 2:	37	%
Fuel power:	80	MW_{fuel}	Input of fuel 2:	n.a.	t/a
Boiler (if steam technology)					
Steam mass flow:	n.a.	t/h	Type of fuel 3:	-	
Steam temperature:	n.a.	°C	Share of fuel 3:	-	%
Steam pressure:	n.a.	bar	Input of fuel3:	-	t/a

Costs			**Emissions**		
Investment costs:	n.a.	Mio €	CO:	n.a.	mg/Nm^3
Spec.investment costs (elec):	n.a.	Mio€/MW_{el}	NO_x:	n.a.	mg/Nm^3
Fuel costs:	53	€/t	Particles:	n.a.	mg/Nm^3
Subsidies:	n.a.	Mio €	C_xH_y:	n.a.	mg/Nm^3
Number of employes:	28		SO_2:	n.a.	mg/Nm^3

Source:

Henrik Ortenblad/Energistyrelsen

n.a.... not available

Name: CHP Harboore

Database No. 28

Basic Info	
Country:	Denmark
Location:	Harboore
Character of plant:	Demonstration plant
Owner:	Babcock & Wilcox Volund
Contact Person:	Mr. Björn Teislev
Telephone:	+45/ 75/ 468847
Fax:	+45/ 75/ 568873
email:	vordbjt@post4.tele.dk
webpage:	n.a.
Year of construction:	1993

Technology			**Fuel**		
Type of power generation:	Gas engine		Total fuel input:	n.a.	t/a
Electric power:	2	MW_{el}	Tot. lower heating value:	n.a.	kWh/kg
Thermal power:	2,8	MW_{th}	Moisture content:	25-30	% wet
Co-firing:	Y				
Fuel conversion:	Gasification				
Annual production electricity:	4,96	GWh/a	Type of fuel 1:	Woodchips (forest residues)	
Annual production heat:	13,46	GWh/a	Share of fuel 1:	n.a.	%
Electric efficiency:	31	%	Input of fuel 1:	n.a.	t/a
Thermal efficiency:	57	%			
Total efficiency:	88	%	Type of fuel 2:	Oil	
Ratio electricity/ heat:	0,54		Share of fuel 2:	n.a.	%
Fuel power:	7,5	MW_{fuel}	Input of fuel 2:	n.a.	t/a
Boiler (if steam technology)					
Steam mass flow:	n.a.	t/h	Type of fuel 3:	-	
Steam temperature:	n.a.	°C	Share of fuel 3:	-	%
Steam pressure:	n.a.	bar	Input of fuel3:	-	t/a

Costs			**Emissions**		
Investment costs:	7,48296	Mio €	CO:	n.a.	mg/Nm^3
Spec.investment costs (elec):	4,923	Mio€/MW_{el}	NO_x:	n.a.	mg/Nm^3
Fuel costs:	n.a.	€/t	Particles:	n.a.	mg/Nm^3
Subsidies:	n.a.	Mio €	C_xH_y:	n.a.	mg/Nm^3
Number of employes:	n.a.		SO_2:	n.a.	mg/Nm^3

Source:

CADDET Denmark NOVA PRO, Technical Brochure No. 116, Sofievej 1, PO Box 80 DK-4340 Tollose/Energistyrelsen

n.a.... not available

Name: Haslev CHP plant

Database No. 29

Basic Info	
Country:	Denmark
Location:	Haslev
Character of plant:	Commercial plant
Owner:	Energi E2
Contact Person:	n.a.
Telephone:	+45 56 31 23 33
Fax:	n.a.
email:	n.a.
webpage:	www.e2.dk
Year of construction:	1989

Technology			**Fuel**		
Type of power generation:	Steam turbine		Total fuel input:	n.a.	t/a
Electric power:	5	MW_{el}	Tot. lower heating value:	4,2	kWh/kg
Thermal power:	13	MW_{th}	Moisture content:	15	% wet
Co-firing:	N				
Fuel conversion:	Combustion				
Annual production electricity:	17	GWh/a	Type of fuel 1:	Straw	
Annual production heat:	64	GWh/a	Share of fuel 1:	100	%
Electric efficiency:	25	%	Input of fuel 1:	n.a.	t/a
Thermal efficiency:	61	%			
Total efficiency:	86	%	Type of fuel 2:	-	
Ratio electricity/ heat:	0,41		Share of fuel 2:	-	%
Fuel power:	n.a.	MW_{fuel}	Input of fuel 2:	-	t/a
Boiler (if steam technology)					
Steam mass flow:	26	t/h	Type of fuel 3:	-	
Steam temperature:	450	°C	Share of fuel 3:	-	%
Steam pressure:	67	bar	Input of fuel3:	-	t/a

Costs			**Emissions**		
Investment costs:	13,7	Mio €	CO:	n.a.	mg/Nm^3
Spec.investment costs (elec):	2,53704	Mio€/MW_{el}	NO_x:	n.a.	mg/Nm^3
Fuel costs:	n.a.	€/t	Particles:	10	mg/Nm^3
Subsidies:	n.a.	Mio €	C_xH_y:	n.a.	mg/Nm^3
Number of employes:	n.a.		SO_2:	n.a.	mg/Nm^3

Source:

Henrik Ortenblad/Energistyrelsen

n.a.... not available

Name: Knudmosevarket

Database No. 30

Basic Info	
Country:	Denmark
Location:	Herning
Character of plant:	Commercial plant
Owner:	EnergiGruppen Jylland a/s
Contact Person:	n.a.
Telephone:	+45 99 26 82 11
Fax:	n.a.
email:	n.a.
webpage:	www. Egjylland.dk
Year of construction:	1995

Technology			**Fuel**		
Type of power generation:	Steam turbine		Total fuel input:	n.a.	t/a
Electric power:	5	MW_{el}	Tot. lower heating value:	2,8	kWh/kg
Thermal power:	10,8	MW_{th}	Moisture content:	10-35	% wet
Co-firing:	N				
Fuel conversion:	Combustion				
Annual production electricity:	80	GWh/a	Type of fuel 1:	Waste	
Annual production heat:	28	GWh/a	Share of fuel 1:	100	%
Electric efficiency:	37	%	Input of fuel 1:	n.a.	t/a
Thermal efficiency:	47,5	%			
Total efficiency:	84,5	%	Type of fuel 2:	-	
Ratio electricity/ heat:	0,78		Share of fuel 2:	-	%
Fuel power:	n.a.	MW_{fuel}	Input of fuel 2:	-	t/a
Boiler (if steam technology)					
Steam mass flow:	n.a.	t/h	Type of fuel 3:	-	
Steam temperature:	n.a.	°C	Share of fuel 3:	-	%
Steam pressure:	n.a.	bar	Input of fuel3:	-	t/a

Costs			**Emissions**		
Investment costs:	19,6	Mio €	CO:	10	mg/Nm^3
Spec.investment costs (elec):	3,92	$Mio€/MW_{el}$	NO_x:	n.a.	mg/Nm^3
Fuel costs:	-37	€/t	Particles:	5	mg/Nm^3
Subsidies:	n.a.	Mio €	C_xH_y:	n.a.	mg/Nm^3
Number of employes:	11		SO_2:	100	mg/Nm^3

Source:

Henrik Ortenblad/Energistyrelsen

n.a.... not available

Name: CHP Hjordkaer

Database No. 31

Basic Info	
Country:	Denmark
Location:	Hjordkaer
Character of plant:	Commercial plant
Owner:	n.a.
Contact Person:	Mr. Kennet Rasmussen
Telephone:	+45/ 74/ 666747
Fax:	n.a.
email:	n.a.
webpage:	www.fjv.dk
Year of construction:	1997

Technology			**Fuel**		
Type of power generation:	Steam turbine		Total fuel input:	n.a.	t/a
Electric power:	1	MW_{el}	Tot. lower heating value:	n.a.	kWh/kg
Thermal power:	2,7	MW_{th}	Moisture content:	50	% wet
Co-firing:	N				
Fuel conversion:	Combustion				
Annual production electricity:	1,78	GWh/a	Type of fuel 1:	Woodchips (saw industry)	
Annual production heat:	15,7	GWh/a	Share of fuel 1:	15	%
Electric efficiency:	16	%	Input of fuel 1:	n.a.	t/a
Thermal efficiency:	60	%			
Total efficiency:	76	%	Type of fuel 2:	Woodchips (forest residues)	
Ratio electricity/ heat:	0,27		Share of fuel 2:	85	%
Fuel power:	3,8	MW_{fuel}	Input of fuel 2:	n.a.	t/a
Boiler (if steam technology)					
Steam mass flow:	4,4	t/h	Type of fuel 3:	-	
Steam temperature:	396	°C	Share of fuel 3:	-	%
Steam pressure:	30	bar	Input of fuel3:	-	t/a

Costs			**Emissions**		
Investment costs:	2,02703	Mio €	CO:	n.a.	mg/Nm^3
Spec.investment costs (elec):	3,37838	Mio€/MW_{el}	NO_x:	n.a.	mg/Nm^3
Fuel costs:	n.a.	€/t	Particles:	n.a.	mg/Nm^3
Subsidies:	n.a.	Mio €	C_xH_y:	n.a.	mg/Nm^3
Number of employes:	n.a.		SO_2:	n.a.	mg/Nm^3

Source:

CADDET Denmark-NOVA PRO, Sofievej 1, PO Box 80, DK-4340 Tollose, www.caddet.co.uk/Energistyrelesen

n.a.... not available

Name: CHP Hogild

Database No. 32

Basic Info	
Country:	Denmark
Location:	Hogild
Character of plant:	Pilote plant
Owner:	Herning company
Contact Person:	Mr. Jörgen Mouritsen
Telephone:	+45/ 9926/ 8211
Fax:	+45/ 9926/ 8212
email:	n.a.
webpage:	www.egjylland.dk
Year of construction:	1994

Technology			**Fuel**		
Type of power generation:	Gas engine		Total fuel input:	n.a.	t/a
Electric power:	0	MW_{el}	Tot. lower heating value:	n.a.	kWh/kg
Thermal power:	0,16	MW_{th}	Moisture content:	30	% wet
Co-firing:	N				
Fuel conversion:	Gasification				
Annual production electricity:	0,18	GWh/a	Type of fuel 1:	Woodchips (forest residues)	
Annual production heat:	1,89	GWh/a	Share of fuel 1:	100	%
Electric efficiency:	22	%	Input of fuel 1:	n.a.	t/a
Thermal efficiency:	57	%			
Total efficiency:	79	%	Type of fuel 2:	-	
Ratio electricity/ heat:	0,39		Share of fuel 2:	-	%
Fuel power:	0,6	MW_{fuel}	Input of fuel 2:	-	t/a
Boiler (if steam technology)					
Steam mass flow:	-	t/h	Type of fuel 3:	-	
Steam temperature:	-	°C	Share of fuel 3:	-	%
Steam pressure:	-	bar	Input of fuel3:	-	t/a

Costs			**Emissions**		
Investment costs:	0,52	Mio €	CO:	n.a.	mg/Nm^3
Spec.investment costs (elec):	4	Mio€/MW_{el}	NO_x:	n.a.	mg/Nm^3
Fuel costs:	n.a.	€/t	Particles:	n.a.	mg/Nm^3
Subsidies:	n.a.	Mio €	C_xH_y:	n.a.	mg/Nm^3
Number of employes:	n.a.		SO_2:	n.a.	mg/Nm^3

Source:

CADDET Denmark-NOVA PRO, Sofievej 1, PO Box 80 DK-4340 Tollose, www.caddet.co.uk/Energistyrelsen

n.a.... not available

Name: Maabjerg CHP plant

Database No. 33

Basic Info	
Country:	Denmark
Location:	Holstebro
Character of plant:	Commercial plant
Owner:	ELSAM I/S
Contact Person:	n.a.
Telephone:	+45 97 40 60 80
Fax:	n.a.
email:	n.a.
webpage:	www.elsam.dk
Year of construction:	1993

Technology			**Fuel**		
Type of power generation:	Steam turbine		Total fuel input:	n.a.	t/a
Electric power:	30	MW_{el}	Tot. lower heating value:	3,98	kWh/kg
Thermal power:	67	MW_{th}	Moisture content:	30	% wet
Co-firing:	Y				
Fuel conversion:	Combustion				
Annual production electricity:	44,5	GWh/a	Type of fuel 1:	Woodchips (forest residues)	
Annual production heat:	400	GWh/a	Share of fuel 1:	11	%
Electric efficiency:	29	%	Input of fuel 1:	n.a.	t/a
Thermal efficiency:	63	%			
Total efficiency:	92	%	Type of fuel 2:	Waste	
Ratio electricity/ heat:	0,46		Share of fuel 2:	56	%
Fuel power:	n.a.	MW_{fuel}	Input of fuel 2:	n.a.	t/a
Boiler (if steam technology)					
Steam mass flow:	123	t/h	Type of fuel 3:	Straw	
Steam temperature:	520	°C	Share of fuel 3:	27	%
Steam pressure:	65	bar	Input of fuel3:	n.a.	t/a

Costs			**Emissions**		
Investment costs:	80	Mio €	CO:	10	mg/Nm^3
Spec.investment costs (elec):	2,66667	$Mio€/MW_{el}$	NO_x:	n.a.	mg/Nm^3
Fuel costs:	-8	€/t	Particles:	10	mg/Nm^3
Subsidies:	n.a.	Mio €	C_xH_y:	n.a.	mg/Nm^3
Number of employes:	34		SO_2:	n.a.	mg/Nm^3

Source:

Henrik Ortenblad/Energistyrelsen

n.a.... not available

Name: Junckers-7

Database No. 34

Basic Info	
Country:	Denmark
Location:	Koege
Character of plant:	Commercial plant
Owner:	Junckers Industries
Contact Person:	n.a.
Telephone:	n.a.
Fax:	n.a.
email:	n.a.
webpage:	n.a.
Year of construction:	1987

Technology			**Fuel**		
Type of power generation:	Steam turbine		Total fuel input:	n.a.	t/a
Electric power:	10	MW_{el}	Tot. lower heating value:	n.a.	kWh/kg
Thermal power:	n.a.	MW_{th}	Moisture content:	10	% wet
Co-firing:	N				
Fuel conversion:	Combustion				
Annual production electricity:	120	GWh/a	Type of fuel 1:	/oodwaste, sawdust, chips and shaving	
Annual production heat:	n.a.	GWh/a	Share of fuel 1:	100	%
Electric efficiency:	20	%	Input of fuel 1:	n.a.	t/a
Thermal efficiency:	n.a.	%			
Total efficiency:	-	%	Type of fuel 2:	-	
Ratio electricity/ heat:	-		Share of fuel 2:	-	%
Fuel power:	n.a.	MW_{fuel}	Input of fuel 2:	-	t/a
Boiler (if steam technology)					
Steam mass flow:	60	t/h	Type of fuel 3:	-	
Steam temperature:	525	°C	Share of fuel 3:	-	%
Steam pressure:	93	bar	Input of fuel3:	-	t/a

Costs			**Emissions**		
Investment costs:	n.a.	Mio €	CO:	n.a.	mg/Nm^3
Spec.investment costs (elec):	n.a.	Mio€/MW_{el}	NO_x:	n.a.	mg/Nm^3
Fuel costs:	n.a.	€/t	Particles:	n.a.	mg/Nm^3
Subsidies:	n.a.	Mio €	C_xH_y:	n.a.	mg/Nm^3
Number of employes:	n.a.		SO_2:	n.a.	mg/Nm^3

Source:

Henrik Ortenblad/Energistyrelsen

n.a.... not available

Name: Junckers-8

Database No. 35

Basic Info	
Country:	Denmark
Location:	Koege
Character of plant:	Commercial plant
Owner:	Junckers Industries
Contact Person:	n.a.
Telephone:	n.a.
Fax:	n.a.
email:	n.a.
webpage:	n.a.
Year of construction:	1998

Technology			**Fuel**		
Type of power generation:	Steam turbine		Total fuel input:	n.a.	t/a
Electric power:	16	MW_{el}	Tot. lower heating value:	n.a.	kWh/kg
Thermal power:	n.a.	MW_{th}	Moisture content:	10	% wet
Co-firing:	N				
Fuel conversion:	Combustion				
Annual production electricity:	120	GWh/a	Type of fuel 1:	/oodwaste, sawdust, chips and shaving	
Annual production heat:	n.a.	GWh/a	Share of fuel 1:	100	%
Electric efficiency:	29	%	Input of fuel 1:	n.a.	t/a
Thermal efficiency:	n.a.	%			
Total efficiency:	-	%	Type of fuel 2:	-	
Ratio electricity/ heat:	-		Share of fuel 2:	-	%
Fuel power:	n.a.	MW_{fuel}	Input of fuel 2:	-	t/a
Boiler (if steam technology)					
Steam mass flow:	64	t/h	Type of fuel 3:	-	
Steam temperature:	525	°C	Share of fuel 3:	-	%
Steam pressure:	93	bar	Input of fuel3:	-	t/a

Costs			**Emissions**		
Investment costs:	n.a.	Mio €	CO:	n.a.	mg/Nm^3
Spec.investment costs (elec):	n.a.	Mio€/MW_{el}	NO_x:	n.a.	mg/Nm^3
Fuel costs:	n.a.	€/t	Particles:	n.a.	mg/Nm^3
Subsidies:	n.a.	Mio €	C_xH_y:	n.a.	mg/Nm^3
Number of employes:	n.a.		SO_2:	n.a.	mg/Nm^3

Source:

Henrik Ortenblad/Energistyrelsen

n.a.... not available

Name: Stirling engine at Technical University

Database No. 36

Basic Info	
Country:	Denmark
Location:	Lyngby
Character of plant:	Testing plant
Owner:	Technical University of Denmark
Contact Person:	Univ.-Prof. Henrik Carlsen
Telephone:	+45/ 45/ 254171
Fax:	+45/ 45/ 930663
email:	hc@mek.dtu.dk
webpage:	n.a.
Year of construction:	1998

Technology			**Fuel**		
Type of power generation:	Stirling engine		Total fuel input:	n.a.	t/a
Electric power:	0	MW_{el}	Tot. lower heating value:	n.a.	kWh/kg
Thermal power:	0,104	MW_{th}	Moisture content:	40	% wet
Co-firing:	N				
Fuel conversion:	Combustion				
Annual production electricity:	n.a.	GWh/a	Type of fuel 1:	Woodchips (forest residues)	
Annual production heat:	n.a.	GWh/a	Share of fuel 1:	100	%
Electric efficiency:	17,3	%	Input of fuel 1:	n.a.	t/a
Thermal efficiency:	69,3	%			
Total efficiency:	86,6	%	Type of fuel 2:	-	
Ratio electricity/ heat:	0,25		Share of fuel 2:	-	%
Fuel power:	0,15	MW_{fuel}	Input of fuel 2:	-	t/a
Boiler (if steam technology)					
Steam mass flow:	-	t/h	Type of fuel 3:	-	
Steam temperature:	-	°C	Share of fuel 3:	-	%
Steam pressure:	-	bar	Input of fuel3:	-	t/a

Costs			**Emissions**		
Investment costs:	n.a.	Mio €	CO:	n.a.	mg/Nm^3
Spec.investment costs (elec):	n.a.	Mio€/MW_{el}	NO_x:	n.a.	mg/Nm^3
Fuel costs:	n.a.	€/t	Particles:	n.a.	mg/Nm^3
Subsidies:	n.a.	Mio €	C_xH_y:	n.a.	mg/Nm^3
Number of employes:	n.a.		SO_2:	n.a.	mg/Nm^3

Source:

H. Carlsen, "40 kW Stirling Engine for Solid Fuel", 31th intersociety energy conversion, engineering conference

n.a.... not available

Name: Biomass CHP Rudkobing

Database No. 37

Basic Info	
Country:	Denmark
Location:	Rudkobing
Character of plant:	Commercial plant
Owner:	n.a.
Contact Person:	Mr. Kurt Pedersen
Telephone:	+45/ 65/ 904444
Fax:	+45/ 65/ 903812
email:	n.a.
webpage:	n.a.
Year of construction:	1990

Technology			**Fuel**		
Type of power generation:	Steam turbine		Total fuel input:	13,73	t/a
Electric power:	3	MW_{el}	Tot. lower heating value:	4,8	kWh/kg
Thermal power:	7,5	MW_{th}	Moisture content:	10-25	% wet
Co-firing:	N				
Fuel conversion:	Combustion				
Annual production electricity:	11,86	GWh/a	Type of fuel 1:	Straw	
Annual production heat:	42,08	GWh/a	Share of fuel 1:	100	%
Electric efficiency:	22	%	Input of fuel 1:	13,73	t/a
Thermal efficiency:	67	%			
Total efficiency:	89	%	Type of fuel 2:	-	
Ratio electricity/ heat:	0,33		Share of fuel 2:	-	%
Fuel power:	11	MW_{fuel}	Input of fuel 2:	-	t/a
Boiler (if steam technology)					
Steam mass flow:	13,8	t/h	Type of fuel 3:	-	
Steam temperature:	450	°C	Share of fuel 3:	-	%
Steam pressure:	60	bar	Input of fuel3:	-	t/a

Costs			**Emissions**		
Investment costs:	8,7	Mio €	CO:	n.a.	mg/Nm^3
Spec.investment costs (elec):	3,41176	Mio€/MW_{el}	NO_x:	n.a.	mg/Nm^3
Fuel costs:	n.a.	€/t	Particles:	n.a.	mg/Nm^3
Subsidies:	n.a.	Mio €	C_xH_y:	n.a.	mg/Nm^3
Number of employes:	n.a.		SO_2:	n.a.	mg/Nm^3

Source:

CADDET Denmark-NOVA PRO, Technical brochure No. 95 , Sofievej 1 PO Box 80 DK-4340 Tollose, www.agores.org/Energistyrelsen

n.a.... not available

Name: Sakskobing

Database No. 38

Basic Info	
Country:	Denmark
Location:	Sakskobing
Character of plant:	Commercial plant
Owner:	n.a.
Contact Person:	n.a.
Telephone:	n.a.
Fax:	n.a.
email:	n.a.
webpage:	n.a.
Year of construction:	1999

Technology			**Fuel**		
Type of power generation:	Steam turbine		Total fuel input:	n.a.	t/a
Electric power:	11	MW_{el}	Tot. lower heating value:	4,2	kWh/kg
Thermal power:	20,3	MW_{th}	Moisture content:	15	% wet
Co-firing:	N				
Fuel conversion:	n.a.				
Annual production electricity:	n.a.	GWh/a	Type of fuel 1:	Straw	
Annual production heat:	n.a.	GWh/a	Share of fuel 1:	100	%
Electric efficiency:	32	%	Input of fuel 1:	n.a.	t/a
Thermal efficiency:	60	%			
Total efficiency:	92	%	Type of fuel 2:	-	
Ratio electricity/ heat:	0,53		Share of fuel 2:	-	%
Fuel power:	n.a.	MW_{fuel}	Input of fuel 2:	-	t/a
Boiler (if steam technology)					
Steam mass flow:	43,2	t/h	Type of fuel 3:	-	
Steam temperature:	542	°C	Share of fuel 3:	-	%
Steam pressure:	93	bar	Input of fuel3:	-	t/a

Costs			**Emissions**		
Investment costs:	n.a.	Mio €	CO:	n.a.	mg/Nm^3
Spec.investment costs (elec):	n.a.	Mio€/MW_{el}	NO_x:	n.a.	mg/Nm^3
Fuel costs:	n.a.	€/t	Particles:	n.a.	mg/Nm^3
Subsidies:	n.a.	Mio €	C_xH_y:	n.a.	mg/Nm^3
Number of employes:	n.a.		SO_2:	n.a.	mg/Nm^3

Source:

Energistyrelsen

n.a.... not available

Name: CHP Skarp Salling

Database No. 39

Basic Info	
Country:	Denmark
Location:	Salling
Character of plant:	Testing plant
Owner:	Energy REKA A/S
Contact Person:	Mr. Christian Larsen
Telephone:	+45/ 9862/ 4011
Fax:	+45/ 9862/ 4071
email:	n.a.
webpage:	n.a.
Year of construction:	1993

Technology			**Fuel**		
Type of power generation:	Stirling engine		Total fuel input:	n.a.	t/a
Electric power:	0	MW_{el}	Tot. lower heating value:	n.a.	kWh/kg
Thermal power:	0,01	MW_{th}	Moisture content:	40	% wet
Co-firing:	N				
Fuel conversion:	Combustion				
Annual production electricity:	n.a.	GWh/a	Type of fuel 1:	Woodchips (forest residues)	
Annual production heat:	n.a.	GWh/a	Share of fuel 1:	100	%
Electric efficiency:	17,6	%	Input of fuel 1:	n.a.	t/a
Thermal efficiency:	58,8	%			
Total efficiency:	76,4	%	Type of fuel 2:	-	
Ratio electricity/ heat:	0,30		Share of fuel 2:	-	%
Fuel power:	0,017	MW_{fuel}	Input of fuel 2:	-	t/a
Boiler (if steam technology)					
Steam mass flow:	-	t/h	Type of fuel 3:	-	
Steam temperature:	-	°C	Share of fuel 3:	-	%
Steam pressure:	-	bar	Input of fuel3:	-	t/a

Costs			**Emissions**		
Investment costs:	n.a.	Mio €	CO:	n.a.	mg/Nm^3
Spec.investment costs (elec):	n.a.	Mio€/MW_{el}	NO_x:	n.a.	mg/Nm^3
Fuel costs:	n.a.	€/t	Particles:	n.a.	mg/Nm^3
Subsidies:	n.a.	Mio €	C_xH_y:	n.a.	mg/Nm^3
Number of employes:	n.a.		SO_2:	n.a.	mg/Nm^3

Source:

brochure: Danish Follow-up programme for small-scale solid biomass CHP plants, danish ministry in charge of energy affairs, www.caddet-re.org

n.a.... not available

Name: Slagelse CHP plant

Database No. 40

Basic Info	
Country:	Denmark
Location:	Slagelse
Character of plant:	Commercial plant
Owner:	Energi E2
Contact Person:	n.a.
Telephone:	+45 58 50 11 56
Fax:	n.a.
email:	n.a.
webpage:	www.e2.dk
Year of construction:	1990

Technology			**Fuel**		
Type of power generation:	Steam turbine		Total fuel input:	26.000	t/a
Electric power:	12	MW_{el}	Tot. lower heating value:	15	kWh/kg
Thermal power:	28	MW_{th}	Moisture content:	15	% wet
Co-firing:	N				
Fuel conversion:	Combustion				
Annual production electricity:	50	GWh/a	Type of fuel 1:	Straw	
Annual production heat:	260	GWh/a	Share of fuel 1:	100	%
Electric efficiency:	32	%	Input of fuel 1:	n.a.	t/a
Thermal efficiency:	48	%			
Total efficiency:	80	%	Type of fuel 2:	-	
Ratio electricity/ heat:	0,67		Share of fuel 2:	-	%
Fuel power:	n.a.	MW_{fuel}	Input of fuel 2:	-	t/a
Boiler (if steam technology)					
Steam mass flow:	40,3	t/h	Type of fuel 3:	-	
Steam temperature:	450	°C	Share of fuel 3:	-	%
Steam pressure:	67	bar	Input of fuel3:	-	t/a

Costs			**Emissions**		
Investment costs:	n.a.	Mio €	CO:	n.a.	mg/Nm^3
Spec.investment costs (elec):	n.a.	Mio€/MW_{el}	NO_x:	n.a.	mg/Nm^3
Fuel costs:	n.a.	€/t	Particles:	n.a.	mg/Nm^3
Subsidies:	n.a.	Mio €	C_xH_y:	n.a.	mg/Nm^3
Number of employes:	n.a.		SO_2:	n.a.	mg/Nm^3

Source:

Energistyrelsen

n.a.... not available

Name: Biomass CHP Masnedo

Database No. 41

Basic Info	
Country:	Denmark
Location:	Vordingborg
Character of plant:	Commercial plant
Owner:	Masnedo CHP Plant
Contact Person:	Mr. Carsten Hübbe
Telephone:	+45/ 53/ 770777
Fax:	+45/ 53/ 777494
email:	n.a.
webpage:	www.e2.dk
Year of construction:	1996

Technology			**Fuel**		
Type of power generation:	Steam turbine		Total fuel input:	43.000.000	t/a
Electric power:	10	MW_{el}	Tot. lower heating value:	4	kWh/kg
Thermal power:	20,8	MW_{th}	Moisture content:	10-25	% wet
Co-firing:	N				
Fuel conversion:	Combustion				
Annual production electricity:	35,5	GWh/a	Type of fuel 1:	Straw	
Annual production heat:	98,8	GWh/a	Share of fuel 1:	88,38	%
Electric efficiency:	29	%	Input of fuel 1:	38.000.000	t/a
Thermal efficiency:	62	%			
Total efficiency:	91	%	Type of fuel 2:	Woodchips (forest residues)	
Ratio electricity/ heat:	0,47		Share of fuel 2:	10	%
Fuel power:	36,1	MW_{fuel}	Input of fuel 2:	5.000.000	t/a
Boiler (if steam technology)					
Steam mass flow:	43	t/h	Type of fuel 3:	Straw	
Steam temperature:	522	°C	Share of fuel 3:	90	%
Steam pressure:	92	bar	Input of fuel3:	n.a.	t/a

Costs			**Emissions**		
Investment costs:	34,2	Mio €	CO:	n.a.	mg/Nm^3
Spec.investment costs (elec):	3,6	Mio€/MW_{el}	NO_x:	n.a.	mg/Nm^3
Fuel costs:	47	€/t	Particles:	n.a.	mg/Nm^3
Subsidies:	n.a.	Mio €	C_xH_y:	n.a.	mg/Nm^3
Number of employes:	17		SO_2:	n.a.	mg/Nm^3

Source:

CADDET Denmark-NOVA PRO, Technical Brochure No. 74, Sofievej 1, PO Box 80 DK-4340 Tollose/Energistyrelsen

n.a.... not available