IEA Bioenergy

Status report on thermal gasification of bimass and waste 2019

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Annex 1
Gasification facilities for CHP production – operational, under construction, under commissioning

At the moment there are over 1500 CHP facilities in operation. Thus, not all of them but only reference facilities with TRL 6-9 are included in this annex.

	Operational
	Under construction / under commissioning

	Owner	**Project name**	**Country**	**Page**
	AEW Energie AG	Pelletvergasser AEW Rheinfelden	CH	3
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	Azienda Agricola Camardo	-	IT	6
	Azienda Agricola Isca di Calvello	Urbas Calvello	IT	7
	Azienda Agricola San Vittore	-	IT	8
	Azienda Tenca dei Frateli Zanotti/AB energy	Orzinuovi	IT	9
	Babcock&Wilcox Volund	CHP Updraft gasifier Yamagata	DK	10
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	Bioenergie Schnellingen	Bioenergie Schnellingen	DE	13
	Biowaerme Eberndorf	CHP Urbas Eberndorf	AT	14
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	Bürgerenergie St. Peter	Bürgerenergie St. Peter	DE	17
	Burkhardt Cham	Burkhardt Cham	DE	18
	Burkhardt Neumarkt	Burkhardt Neumarkt	DE	19
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	Centro Cisa	Castel DAAiano	IT	21
	Ciamber	-	IT	22
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	Emamejeriet AB	Emamejeriet (Ema dairy)	SE	25
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	Eomande Energie	Puidoux Woodgasifier	CH	27
	Ettenberger Fulda	Ettenberger Fulda	DE	28
	Fernwaerme Neumarkt GmbH&Co. KG	CHP Urbas Neumarkt	AT	29
	Friedrich Wahl GmbH & co. KG	CHP Urbas Sulzbasch-Laufen	DE	30
	Graebner Esslingen	Graebner Esslingen	DE	31
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	GRETHA	Nongbua DFB Gasifier	TH	34
	Guascor Italia	Rossano Calabro (CS)	IT	35
	HEH Holzenergie	CHP Pfalzfeld	DE	36
	HGKW Bad Wildungen GmbH	HGKW Bad Wildungen GmbH	DE	37
	H.H. Käser GmbH	Holzgasanlage 1 Käser Gasel	CH	38

	H.H. Käser GmbH	Holzgasanlage 2 Käser Gasel	CH	39
	Holzstrom aus Nidwalden	CHP Pyroforce Nidwalden	CH	40
	Holzstrom GmbH	CHP Urbas Neukirchen	AT	41
	HS Energieanlagen GmbH	CHP Heatpipe Reformer Neufahrn	DE	42
	Josef Bucher AG Escholzmatt	Holzverstromungsanlage Bucher Escholzmatt	CH	43
	Kokemaen Laempoe Oy	CHP power plant	FI	44
	Kuntschar Wolfshagen	Kuntschar Wolfshagen	DE	45
	KWS Landshut	KWS Landshut	DE	46
	KWS Ostalb	KWS Ostalb	DE	47
	Lahti Energia Oy	Kymijärvi II	FI	48
	Lamprecht	Lamprecht GmbH	IT	49
	Ligento Nürnberg	Ligento Nürnberg	DE	50
	Muensterland Energy Gmbh	Muensterland Energy Gmbh	DE	51
	Naturenergie Hersbruck GmbH & Co. KG	Naturenergie Hersbruck GmbH & Co. KG	DE	52
	Nurmes	Micro-scale biomass gasification CHP Volter	FI	53
	PoliTo	Wood gasifier	IT	54
	Pritscher Landshut	Pritscher Landshut	DE	55
	Qalovis Altenberge	Qalovis	DE	56
	Rau GmbH	Urbas Balingen	DE	57
	RegaWatt	RegaWatt Abensberg	DE	58
	SEK Koblenz	KSV Koblenz	DE	59
	Sindal District Heating Company	Dall Energy CHP plant in Sindal	DK	60
	Spanner Bamberg	Spanner Bamberg	DE	62
	Spanner Landshut	Spanner Landshut	DE	63
	Stadtwerke Düsseldorf	CHP Arnsberg-Wildhausen	DE	64
	Stadtwerke Konstanz	CHP Urbas Konstanz	DE	65
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	Steiner A. & Cie AG	-		67
	SynCraft	CraftWerk Stadl	AT	68
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	SynCraft	CraftWerk Innsbruck	AT	72
	Urbas Energietechnik	CHP Demo Urbas	AT	73
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	Wärmeversorgung Grossenhain/POW AG	CHP Grossenhain	DE	75
	Wegscheid Aschaffenburg	Wegscheid Aschaffenburg	DE	76
	Wegscheid Bamberg	Wegscheid Bamberg	DE	77
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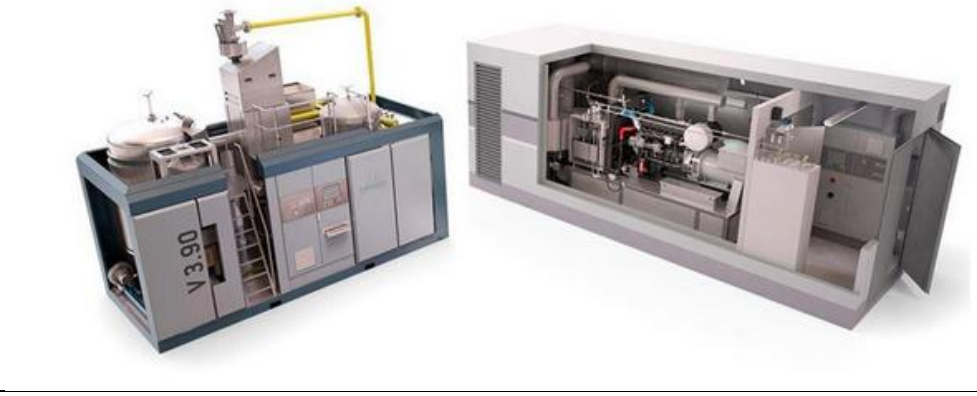
	WUN Bioenergy	WUN Bioenergy	DE	81

Project name	Pelletvergasser AEW Rheinfelden
Project owner	AEW Energie AG
Status	operational
Start up	2018
Country	Switzerland
City	Rheinfelden
Type	TRL 9 Commercial
Technology	Power / CHP
Input 1	Wood pellets (110 kg/h)
Output 1	Power (electricity) (0.165 MWel)
Output 2	Heat (0.26 MWth)
Output additional Information	CHP Unit 0,165 Mwel + 0,26 MWth for district heating
Technology Brief	Burkhardt pellet Gasifier CHP (fluidized bed in co current flow)
Additional Information	www.aew.ch/home.html http://burkhardt-energy.com/hp538/Technik.htm http://burkhardt-energy.com/hp538/Technik.htm
Contact	marcel.kraenzlin@aew.ch louis.luz@aew.ch



Project name	CHP Agnion Biomasse Heizkraftwerk Pfaffenhofen
Project owner	Agnion Technologies GmbH
Status	Operational
Start up	2001
Country	Germany
City	Pfaffenhofen
Type	TRL 4-5
Technology	CHP / Synthesis
Raw Material	Lignocellulosic crops
Input 1	Waste wood (80 000 t/y)
Output 1	Heat (28 MWth)
Output 2	Power (electricity) (6,1 MWel)
Technology Brief	The agnion Heatpipe-Reformer is a gasification technology that offers the solution to the allothermal reformer heat transport issue by using heatpipes. Due to elevated heat transport density and decoupling of gasification and combustion by heatpipes
Additional Information	www.agnion.de
	

Project name	CHP Autogasnord
Project owner	Autogasnord
Status	Operational
Start up	
Country	Italy
City	Caluso
Type	TRL 9 Commercial
Technology	CHP
Raw Material	Wood chips
Output 1 Name	Power (electricity)
Output 1 Capacity	0,400
Output 1Unit	MWel
Output 2 Name	Heat
Output 2 Capacity	0,600
Output 2 Unit	MWth
Partners	Agroenergia/CIP Group/Energy calor/Sitech Italia
Technology Brief	Pyrogasification
Additional Information	www.autogasnord.it
Contact	Not known

Project name	
Project owner	Azienda agricola Camardo
Status	Operational
Start up	2012
Country	Italy
City	Pomarico
Type	TRL 9 Commercial
Technology	CHP
Raw Material	Wood chips
Output 1 Name	Power (electricity)
Output 1 Capacity	0,300
Technology Brief	Pyrogasifier
Additional Information	www.bioewatt.com
Contact	Not known

Project name	Urbas Calvello
Project owner	Azienda Agricola Isca di Calvello
Status	Operational
Start up	2015
Country	Italy
City	Calvello
Type	CHP
Technology	TRL 9 Commercial
Raw Material	Wood chips
Output 1 Name	Power
Output 1 Capacity	0,199
Output 1Unit	MWel
Output 2 Name	Heat
Output 2 Capacity	0,34
Output 2 Unit	MWth
Partners	Urbas
Technology Brief	A combustible gas, wood gas, is drawn from wood through a means of thermochemical processes which take place in a specially designed reactor. The raw gas is then separated of dust and tars through a filtering system. This cleaned gas is then used to produce combined heat and power through a gas engine + generator. Unlike other CHP technologies which are based on the combustion of biomass, and require a working medium, (water in a steam turbine, heat oil in the ORC-process) wood gas cogeneration requires no intermediate medium thus resulting in a higher electrical efficiency throughout the entire system.
Additional Information	
Contact	Gianfranco Misuriello +39 3334711383

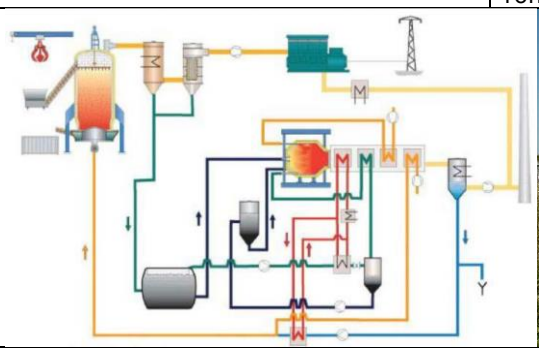
Project name	
Project owner	Azienda Agricola San Vittore
Status	Operational
Start up	
Country	Italy
City	Vigevano
Type	TRL 9 Commercial
Technology	CHP
Raw Material	Wood chips
Output 1 Name	Power (electricity)
Output 1 Capacity	0,500
Output 1Unit	MWel
Output 2 Name	Heat
Output 2 Capacity	0,400
Output 2 Unit	MWth
Technology Brief	Downdraft gasifier
Additional Information	
Contact	Not known

Project name	CHP Orziunovi
Project owner	Azienda Tenca dei Fratelli Zanotti/AB energy
Status	Operational
Start up	2009
Country	Italy
City	Orziunovi
Type	TRL 9 Commercial
Technology	CHP
Raw Material	Lignocellulosics
Output 1 Name	Power (electricity)
Output 1 Capacity	0,3
Output 1Unit	MWel
Output 2 Name	Heat
Technology Brief	Downdraft gasifier - opencore
Additional Information	http://www.crpa.it/media/documents/crpa_www/Progetti/Seq-Cure/Documentazione/Deliverable_2008/Deliverable_02.pdf
Contact	dott. Fabio Santelli T +39 031.758247 F +39 031.7600548 E-mail: info@bio-e-watt.com

Project name	CHP Updraft gasifier Yamagata
Project owner	Babcock&Wilcox Volund Yamagata Green Power Co., Ltd.
Status	operational
Start up	2007
Country	Japan
City	Yamagata
Type	TRL 9 commercial
Technology	CHP
Raw Material	Wood chips (65 mt/d)
Output 1	Power (electricity) (2 MWe)
Output 2	Heat (8 MWth)
Technology Brief	Updraft gasifier, air blown
Contact	Robert Heeb roh@volund.dk

Project name	CHP Updraft gasifier Daio
Project owner	Babcock&Wilcox Volund
Status	Operational
Start up	
Country	Japan
City	Kani-city, Gifu prefecture
Type	TRL 9 Commercial
Technology	Power / CHP
Raw Material	Lignocellulosics
Output 1	Heat (12 MWth)
Output 2	
Technology Brief	Updraft gasifier air blown
Contact	

Project name	CHP B&W Harboore
Project owner	Babcock&Wilcox Volund
Status	Operational
Start up	1996
Country	Denmark
City	Harboore
Type	TRL9 Commercial
Technology	CHP
Raw Material	Wood chips
Output 1 Name	Power (electricity)
Output 1 Capacity	1
Output 1Unit	MWel
Output 2 Name	Heat
Output 2 Capacity	3
Output 2 Unit	MWth
Total Investment	100,6 Mio.
Total Investment Currency	DKK
Total Investment Explanation	100,6 mio DKK for electromechanical parts
Partners	
Technology Brief	Originally designed for district heating only, later in 2000 CHP capability added; updraft gasifier (Dr. Gratzke); air blown
Contact	Robert Heeb roh@volund.dk



Project name	Bioenergie Schnellingen
Project owner	Bioenergie Schnellingen
Status	Operational
Start up	2015
Country	Germany
City	Haslach
Type	TRL 9 – commercial
Technology	Power/CHP
Raw Material	Wood chips
Output 1	Power (electricity) (0,4 MWel)
Output 2	Heat (0,518 MWth)
Technology Brief	Fluidized bed process in cocurrent flow (Burkhardt)
Contact	+497832 975130 +497832 9751328

Project name	CHP Urbas Eberndorf
Project owner	Biowärme Eberndorf
Status	Operational
Start up	2015
Country	Austria
City	Eberndorf
Type	TRL 9 Commercial
Technology	CHP
Raw Material	Wood chips
Output 1 Name	Power (electricity)
Output 1 Capacity	0,300 + 0,130
Output 1Unit	MWel
Output 2 Name	Heat
Output 2 Capacity	0,600 + 0,250
Output 2 Unit	MWth
Partners	Urbas Stahl&Anlagenbau, Voelkermarkt
Technology Brief	A combustible gas, wood gas, is drawn from wood through a means of thermochemical processes which take place in a specially designed reactor. The raw gas is then separated of dust and tars through a filtering system. This cleaned gas is then used to produce combined heat and power through a gas engine + generator. Unlike other CHP technologies which are based on the combustion of biomass, and require a working medium, (water in a steam turbine, heat oil in the ORC-process) wood gas cogeneration requires no intermediate medium thus resulting in a higher electrical efficiency throughout the entire system.
Additional Information	www.urbas.at
Contact	Ing. Peter Urbas p.urbas@urbas.at

Project name	Urbas Mallnitz
Project owner	Biowaerme Mallnitz GmbH
Status	Operational
Start up	2013
Country	Austria
City	Mallnitz
Type	TRL 9 Commercial
Technology	CHP
Raw Material	Wood chips
Output 1 Name	Power (electricity)
Output 1 Capacity	0,250
Output 1Unit	MWel
Output 2 Name	Heat
Output 2 Capacity	0,540
Output 2 Unit	MWth
Technology Brief	A combustible gas, wood gas, is drawn from wood through a means of thermochemical processes which take place in a specially designed reactor. The raw gas is then separated of dust and tars through a filtering system. This cleaned gas is then used to produce combined heat and power through a gas engine + generator. Unlike other CHP technologies which are based on the combustion of biomass, and require a working medium, (water in a steam turbine, heat oil in the ORC-process) wood gas cogeneration requires no intermediate medium thus resulting in a higher electrical efficiency throughout the entire system.
Contact	Anton Glantschnig Tel. +43 664 156 78 58

Project name	
Project owner	Bio&Watt
Status	Operational
Start up	2010
Country	Italy
City	Oltrepo Pavese
Type	TRL 9 Commercial
Technology	CHP
Raw Material	Wood chips
Output 1 Name	Power (electricity)
Output 1 Capacity	0,300
Output 1Unit	MWel
Technology Brief	Pyrogasifier
Additional Information	www.bioewatt.com
Contact	Not known

Project name	Bürgerenergie St. Peter
Project owner	Bürgerenergie St. Peter
Status	Operational
Start up	2013
Country	Germany
City	St. Peter
Type	TRL 9 – commercial
Technology	Power/CHP
Raw Material	Wood pellets, wood chips
Output 1	Power (0,18 MWel)
Output 2	Heat (0,27 MWth)
Technology Brief	Fluidized bed process in cocurent flow
Additional Information	Burkhardt gasifier
Contact	Tel 07660 9417450 info@buergerenergie-st-peter.de m.bohnert@buergerenergie-st-peter.de

Project name	Burkhardt Cham
Project owner	Burkhardt Cham
Status	Operational
Start up	2009
Country	Germany
City	Landkreis Cham
Type	TRL 9 –commercial
Technology	Power /CHP
Raw Material	Wood pellets, wood chips
Output 1	Power (0,18 MWel)
Output 2	Heat (0,27 MWth)
Technology Brief	Fluidized bed in cocurrent flow
Additional Information	Burkhardt gasifier
Contact	info@burkhardt-gmbh.de 09185 94 01-0

Project name	Burkhardt Neumarkt
Project owner	Burkhardt Neumarkt
Status	Operational
Start up	2010
Country	Germany
City	Neumarkt Landkreis
Type	TRL 9 –commercial
Technology	Power /CHP
Raw Material	Wood pellets, wood chips
Output 1	Power (0,18 MWel)
Output 2	Heat (0,27 MWth)
Technology Brief	Fluidized bed in cocurrent flow
Additional Information	Burkhardt gasifier
Contact	info@burkhardt-gmbh.de 09185 94 01-0

Project name	Burkhardt Nürnberger Land
Project owner	Burkhardt Nürnberger Land
Status	Operational
Start up	2009
Country	Germany
City	Landkreis Nürnberg
Type	TRL 9 –commercial
Technology	Power /CHP
Raw Material	Wood pellets, wood chips
Output 1	Power (0,18 MWel)
Output 2	Heat (0,27 MWth)
Technology Brief	Fluidized bed in cocurrent flow
Additional Information	Burkhardt gasifier
Contact	info@burkhardt-gmbh.de 09185 94 01-0

Project name	Castel DÂ´Aiano
Project owner	Centro Cisa
Status	Operational
Start up	2008
Country	Italy
City	Castel DÂ´Aiano
Type	TRL 9 Commercial
Technology	CHP
Raw Material	Wood chips
Output 1 Name	Power (electricity)
Output 1 Capacity	0,035
Output 1Unit	MWel
Output 2 Name	Heat
Output 2 Capacity	0,14
Output 2 Unit	MWth
Partners	Provincia Bologna; Consorzio Cosea
Technology Brief	updraft gasifier+Stirling engine
Contact	Eng. Sergio Palmieri/Filippo Marino © CISA – Centro Innovazione per la Sostenibilità Ambientale Piazza Libertà, 13 - 40046 Porretta Terme (BO) Tel. e Fax 0534 521104 cisa@comune.porrettaterme.bo.it Progetto Bo110 Obiettivo2 - Provincia di Bologna

Project name	
Project owner	Ciamber
Status	Operational
Start up	
Country	Italy
City	Forno di Zoldo
Type	TRL 9 Commercial
Technology	CHP
Output 1 Name	Power (electricity)
Output 1 Capacity	1
Output 1Unit	MWel
Output 2 Name	Heat
Output 2 Capacity	0,8
Output 2 Unit	MWth
Partners	Edilgoima srl
Technology Brief	Downdraft with 4 engines Cummins power generation 1710-G
Contact	Not known

Project name	
Project owner	Comune Quingentole
Status	Operational
Start up	2006
Country	Italy
City	Quingentole
Type	TRL 9 Commercial
Technology	CHP
Raw Material	Wood chips
Output 1 Name	Power
Output 1 Capacity	0,070
Output 1Unit	MWel
Output 2 Name	Heat
Output 2 Capacity	0,140
Output 2 Unit	MWth
Technology Brief	Downdraft gasifier
Additional Information	www.bioenergy-world.com/europe/2008/IMG/pdf/28_Bettella_CAEMA.pdf www.caemaenergia.com
Contact	www.comune.quingentole.mn.it

Project name	
Project owner	Duchi Fratelli Societa Agricola/Agroenergia
Status	Operational
Start up	2010
Country	Italy
City	Gadesco Pieve Delmona
Type	TRL 9 Commercial
Technology	CHP
Raw Material	Wood chips
Output 1 Name	Power (electricity)
Output 1 Capacity	0,960
Output 1Unit	MWel
Output 2 Name	Heat
Output 2 Capacity	3,2
Output 2 Unit	MWth
Partners	Agroenergia
Technology Brief	3 gasifier downdraft open core
Contact	Not known

Project name	Emamejeriet (Ema dairy)
Project owner	Emamejeriet AB
Status	Operational
Start up	2015
Country	Sweden
City	Hultsfred
Type	TRL 8 First-of-a-kind commercial demo Volter gasifier
Technology	Power / CHP
Raw Material	Forest residues
Output 1	Power (electricity) (0.04 MWel)
Output 2	Heat (0.1 MWth)
Output 3	Cooling (70 kW)
Partners	Energikotor Sydost
Additional information	http://www.energikontorsydost.se/hultsfred
Contact	Karoline Alvanger karoline.alvanger@energikontorsydost.se Tel: +46 709 21 60 52

Project name	Urbas Terni
Project owner	Energia Uno
Status	Operational
Start up	2015
Country	Italy
City	Terni
Type	TRL 9 Commercial
Technology	CHP
Raw Material	Lignocellulosic biomass
Input 1 Name	Wood chips
Output 1 Name	Power
Output 1 Capacity	0,199
Output 1Unit	MWel
Output 2 Name	Heat
Output 2 Capacity	0,340
Output 2 Unit	MWth
Technology Brief	A combustible gas, wood gas, is drawn from wood through a means of thermochemical processes which take place in a specially designed reactor. The raw gas is then separated of dust and tars through a filtering system. This cleaned gas is then used to produce combined heat and power through a gas engine + generator. Unlike other CHP technologies which are based on the combustion of biomass, and require a working medium, (water in a steam turbine, heat oil in the ORC-process) wood gas cogeneration requires no intermediate medium thus resulting in a higher electrical efficiency throughout the entire system.
Additional Information	
Contact	Marco Cinaglia Phone: +39 3408191329

Project name	Puidoux Woodgasifier
Project owner	Eomande Energie
Status	Operational
Start up	2018
Country	Switzerland
City	Puidoux
Type	TRL 9 Commercial
Technology	Power / CHP
Raw Material	Wood chips
Output 1	Power (electricity) (0,89 MWel)
Output 2	Heat (4,5 MWth)
Technology Brief	Regawatt updraft gasifier Heat used for district heating
Contact	Caimi Giulio Giulio.Caimi@romande-energie.ch

Project name	Ettenberger Fulda
Project owner	Ettenberger Fulda
Status	Operational
Start up	
Country	Germany
City	Fulda
Type	TRL 9 Commercial
Technology	Power / CHP
Raw Material	Wood chips
Output 1	Power (electricity) (0,012 MWel)
Output 2	Heat (0,052 MWth)
Partners	Ettenberger GmbH
Technology Brief	Tiered gasification process in combination
Contact	holzgas@ettenberger.de 0661 29107040

Project name	CHP Urbas Neumarkt
Project owner	Fernwäme Neumarkt Ges.m.b.H. & Co.KG
Status	Operational
Start up	2008
Country	Austria
City	Neumarkt
Type	TRL 9 Commercial
Technology	CHP
Raw Material	Wood chips
Output 1 Name	Power (electricity)
Output 1 Capacity	0,240
Output 1Unit	MWel
Output 2 Name	Heat
Output 2 Capacity	0,580
Output 2 Unit	MWth
Partners	Urbas Stahl&Anlagenbau, Voellkermarkt
Technology Brief	A combustible gas, wood gas, is drawn from wood through a means of thermochemical processes which take place in a specially designed reactor. The raw gas is then separated of dust and tars through a filtering system. This cleaned gas is then used to produce combined heat and power through a gas engine + generator. Unlike other CHP technologies which are based on the combustion of biomass, and require a working medium, (water in a steam turbine, heat oil in the ORC-process) wood gas cogeneration requires no intermediate medium thus resulting in a higher electrical efficiency throughout the entire system.
Contact	Herbert Ofner Tel.:+43 664 4501564

Project name	CHP Urbas Sulzbach-Laufen
Project owner	Friedrich Wahl GmbH & Co. KG
Status	Operational
Start up	2009
Country	Germany
City	Sulzbach-Laufen
Type	TRL 9 Commercial
Technology	CHP
Raw Material	Wood chips
Output 1 Name	Power (electricity)
Output 1 Capacity	0,13
Output 1Unit	MWel
Output 2 Name	Heat
Output 2 Capacity	0,28
Output 2 Unit	MWth
Partners	Urbas
Technology Brief	The gasificator works in the scheme of a downdraft gasifer, which is an improvement of the gasificator of Imbert. A combustible gas, wood gas, is drawn from wood through a means of thermochemical processes which take place in a specially designed reactor. The raw gas is then separated of dust and tars through a filtering system. This cleaned gas is then used to produce combined heat and power through a gas engine + generator. Unlike other CHP technologies which are based on the combustion of biomass, and require a working medium, (water in a steam turbine, heat oil in the ORC-process) wood gas cogeneration requires no intermediate medium thus resulting in a higher electrical efficiency throughout the entire system.
Additional Information	
Contact	Sabine Mertzlufft Tel. +49 7976 9858 40

Project name	Graebner Esslingen
Project owner	Graebner Esslingen
Status	Operational
Start up	2011
Country	Germany
City	Landkreis Esslingen
Type	TRL 9 Commercial
Technology	Power / CHP
Raw Material	Wood pellets
Output 1	Power (electricity) (0.03 MWel)
Output 2	Heat (0,06 MWth)
Partners	Hans Gräbner Apparatebau
Contact	Phone: 09274 909 251

Project name	Graebner Hochsauerland
Project owner	Graebner Hochsauerland
Status	Operational
Start up	2005
Country	Germany
City	Hochsauerlandkreis
Type	TRL 9 Commercial
Technology	Power / CHP
Raw Material	Wood pellets
Output 1	Power (electricity) (0.03 MWel)
Output 2	Heat (0,06 MWth)
Partners	Hans Gräbner Apparatebau
Contact	Phone: 09274 909 251

Project name	Graebner Rosenheim
Project owner	Graebner Rosenheim
Status	Operational
Start up	2009
Country	Germany
City	Landkreis Rosenheim
Type	TRL 9 Commercial
Technology	Power / CHP
Raw Material	Wood chips
Output 1	Power (electricity) (0.03 MWel)
Output 2	Heat (0,06 MWth)
Partners	Hans Gräbner Apparatebau
Contact	Phone: 09274 909 251

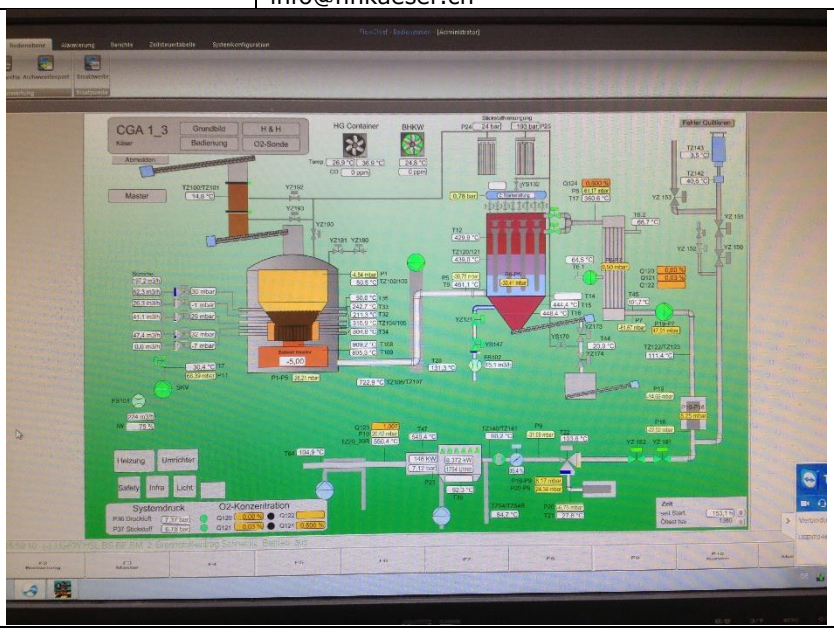
Project name	Nongbua DFB gasifier
Project owner	GRETHA
Status	Operational
Start up	2018
Country	Thailand
City	Nakhon Sawan
Type	TRL 9 Commercial
Technology	Power / CHP
Raw Material	Wood chips (3.8 MWth) and various biomass to be tested
Output 1	power (electricity) (1 MWel)
Output 2	heat (1.25 MWth)
Partners	GRETHA
Technology brief	The plant in Nongbua uses the same DFB gasification technology as the Güssing plant. Dual Fluidized Bed (DFB) gasification system was developed by the Vienna University of Technology, and the first plant has been successfully installed for a 8 MWth commercial scale power plant in Güssing, Austria in 2001. Then it has been further constructed and operated in several other plants in different sizes (up to 32MW fuel input). In Thailand, new engineering design and improvements from Güssing plant on certain equipment are conducted including improved fuel feeding system, biomass dryer, gasifier design, tar scrubber design, and heat exchanger system. With all the advanced and improved technology, the 3.8 MWth prototype DFB gasifier is the first DFB gasifier plant that can be operated with various biomass resources such as wood chips, sugarcane leaf, corncob, and other biomass renewable resources.
Additional information	http://www.gussingrenewable.asia/ http://www.gussingrenewable.asi
Contact	Dr. Janjira Hongrapipat Technical Director (Ph.D. in Chemical and Process Engineering) Gussing Renewable Energy (Thailand) Co., Ltd. No.75, Chan Kao Road, Chongnonsi Sub District, Yanawa District, Bangkok 10120 Thailand Office: +66 2 652 5256 Mobile: +66 85 122 5653

Project name	Rossano Calabro (CS)
Project owner	Guascor Italia
Status	Operational
Start up	2003
Country	Italy
City	Rossano Calabro
Type	TRL 9 Commercial
Technology	CHP
Raw Material	Olive husks, industry wood, agro-forest waste
Output 1 Name	Power (electricit)
Output 1 Capacity	4,2
Output 1Unit	MWel
Technology Brief	There are three independent systems connected to complete the plant: biomass feeding and gasification, biogas cleaning system, and biogas condition and electric generation system. The gasifier is feed by wooden residues by wood industry and agro-forest and olive husk, the annual biomass consumption is 35868 t/a (Source: CTI).
Additional Information	
Contact	Guascor Italia Via Orvieto, 12 - Pomezia (RM) Tel. 06/9162780 Fax. 06/91251042 commerciale@guascor.it

Project name	CHP Pfalzfeld
Project owner	HEH Holzenergie
Status	Under construction
Start up	
Country	Germany
City	Pfalzfeld
Type	TRL – commercial
Technology	Power / CHP
Raw Material	Lignocellulosics
Output 1	Power (electricity) (1MWel)
Output 2	Heat
Partners	Mothermik CHP Technology GmbH
Technology Brief	Fixed bed downdraft gasifier, air blown

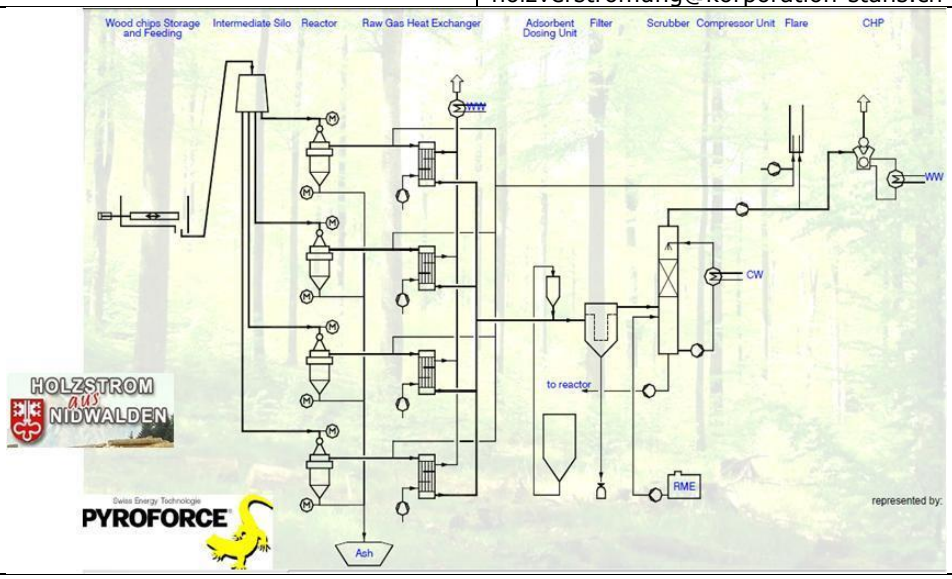
Project name	HGKW Bad Wildungen GmbH
Project owner	HGKW Bad Wildungen GmbH
Status	Operational
Start up	
Country	Germany
City	Bad Wildungen
Type	TRL 9 – commercial
Technology	Power / CHP
Raw Material	Wood chips
Output 1	Power (electricity) (0,36 MWel)
Output 2	Heat (0,38 MWth)
Partners	Xyloenergy GmbH
Technology Brief	Fixed-bed process in cocurrent flow. The process chain starts with the storage and drying of the wood chips in a specially built storage hall. From there, the timber is transported via a conveyor belt into a drying facility and forwarded directly to the wood gasification after drying. Here the timber is in a thermo-chemical combustion process in three phases (pyrolysis, oxidation, reduction) is converted to gas. A scrubber and a special filter cleaned after the gas before it is passed via a fan in the engine.
Contact	Telefon +49 (0)5621 9690582 Telefax +49 (0)5621 9690583 Mobil +49 (0)170 1803569 E-mail: technik@hgkw.de

Project name	Holzgasanlage Käser Gasel
Project owner	H.H. Käser GmbH Bodenackerweg 31 3144 Gasel
Status	operational
Start up	15.12.2015
Country	Switzerland
City	CH-3144 Gasel
Type	TRL 9 commercial
Technology	CHP downdraft fixbed gasifier
Raw Material	lignocellulosic crops
Input 1 Name	Wood chip
Input 1 Capacity	133
Input 1Unit	kg/h
Input additional Information	3.2 t/d
Output 1 Name	electricity
Output 1 Capacity	0.140
Output 1Unit	MWel
Output 2 Name	heat
Output 2 Capacity	0.240
Output 2 Unit	MWtherm
Output additional Information	CHP Unit 0,14 Mwel + 0,24 MWth for commercial chip wood drying unit
Technology Brief	Downdraft Ligento Gasifier
Additional Information	http://www.hhkaeser.ch/hh-kaser http://www.gunep.ch/aktuell/index.html#a1100 http://www.ligento.de/produktdaten.html
Contact	info@hhkaeser.ch



Project name	Holzgasanlage 2 Käser Gasel
Project owner	H.H. Käser GmbH Bodenackerweg 31 3144 Gasel
Status	commissioning
Start up	2017
Country	Switzerland
City	CH-3144 Gasel
Type	TRL 9 commercial
Technology	CHP downdraft fixbed gasifier
Raw Material	lignocellulosic crops
Input 1 Name	Wood chip
Input 1 Capacity	133
Input 1Unit	kg/h
Input additional Information	3.2 t/d
Output 1 Name	electricity
Output 1 Capacity	0.140
Output 1Unit	MWel
Output 2 Name	heat
Output 2 Capacity	0.240
Output 2 Unit	MWtherm
Output additional Information	CHP Unit 0,14 Mwel + 0,24 MWth for commercial chip wood drying unit
Total Investment	EUR 680 000
Total Investment Explanation	Investment Includes: CHP gasifier unit, connection to heating device and power.
Technology Brief	Downdraft Ligento Gasifier
Additional Information	http://www.hhkaeser.ch/hh-kaser http://www.gunep.ch/aktuell/index.html#a1100 http://www.ligento.de/produktdaten.html
Contact	info@hhkaeser.ch

Project name	CHP Pyroforce Nidwalden
Project owner	Holzstrom aus Nidwalden
Status	operational
Start up	2007
Country	Switzerland
City	Stans
Type	TRL 9 Commercial
Technology	Power/CHP
Raw Material	Lignocellulosic crops
Input 1 Name	dried chips from demolition wood
Output 1 Name	Power (electircity)
Output 1 Capacity	1,38
Output 1Unit	MWel
Output 2 Name	Heat
Output 2 Capacity	1,2
Output 2 Unit	MWth
Technology Brief	2-zone downdraft Pyroforce gasifier The plant has 2 independent CHP gasifier lines. Each lines contains 4 parallel gasifier with raw gas cooler. The cooled wood gas flows then to a common gas filter and fuels 1 Jennbacher gas engine.
Contact	Bernhard Boecker-Riese boecker-riese@br-engineering.ch Hans Bieri holzverstromung@korporation-stans.ch

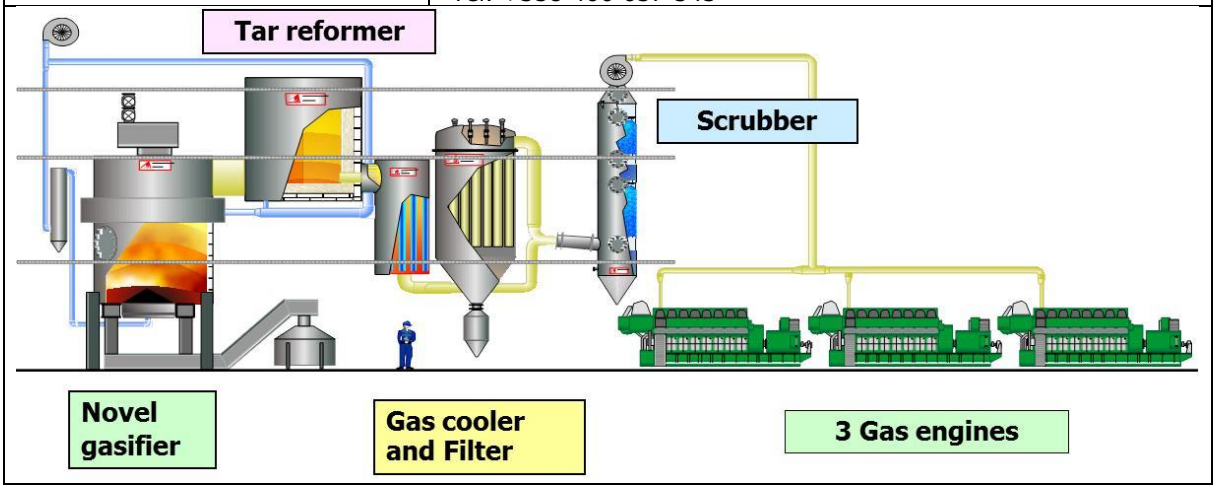


Project name	CHP Urbas Neukirchen
Project owner	Holzstrom GmbH
Status	Operational
Start up	2011
Country	Austria
City	Neukirchen an der Enknach
Type	TRL 9 Commercial
Technology	CHP
Raw Material	Wood chips
Output 1 Name	Power (electricity)
Output 1 Capacity	2x0,175
Output 1Unit	MWel
Output 2 Name	Heat
Output 2 Capacity	0,600
Output 2 Unit	MWth
Partners	Urbas StahlAnlagenbau, Voelkermarkt
Technology Brief	A combustible gas, wood gas, is drawn from wood through a means of thermochemical processes which take place in a specially designed reactor. The raw gas is then separated of dust and tars through a filtering system. This cleaned gas is then used to produce combined heat and power through a gas engine + generator. Unlike other CHP technologies which are based on the combustion of biomass, and require a working medium, (water in a steam turbine, heat oil in the ORC-process) wood gas cogeneration requires no intermediate medium thus resulting in a higher electrical efficiency throughout the entire system.
Additional Information	
Contact	Johann Wurhofer Tel.: +43 664 2425408

Project name	CHP Heatpipie Reformer Neufahrn bei Freising
Project owner	HS Energieanlagen GmbH
Status	Operational
Start up	
Country	Germany
City	Neufahrn bei Freising
Type	TRL 9 Commercial
Technology	CHP
Raw Material	Lignocellulosic crops
Input 1 Name	Waste and clean wood
Output 1 Name	Power (electricity)
Output 1 Capacity	0,11
Output 1Unit	MWel
Output 2 Name	Heat
Output 2 Capacity	0,25
Output 2 Unit	MWth
Partners	Hartl KG
Technology Brief	Heat pipe reformer, FB; allotherm, steam blown CHP; heat supply for a nearby electrical distributor and the HS Energieanlagen GmbH office
Additional Information	
Contact	Not known

Project name	Holzverstromungsanlage Bucher Escholzmatt
Project owner	Josef Bucher AG Escholzmatt
Status	operational
Start up	1.4.2015
Country	Switzerland
City	CH-6182 Escholzmatt
Type	TRL 9 commercial
Technology	CHP downdraft fixbed gasifier
Raw Material	lignocellulosic crops
Input 1 Name	Wood chip
Input 1 Capacity	4700
Input 1Unit	m3/y
Input additional Information	15 m3/d
Output 1 Name	electricity
Output 1 Capacity	0.130
Output 1Unit	MWel
Output 2 Name	heat
Output 2 Capacity	0.260
Output 2 Unit	MWtherm
Output additional Information	CHP Unit 0,13 Mwel + 0,26 MWth for district heating
Total Investment	1.5 Mio CHF
Total Investment Currency	CHF
Total Investment Explanation	Investment Includes: building, heat and power gasifier unit, connection to district heating and power as well Feedstock bunker and handling devices.
Technology Brief	Downstream Wegscheidt Gasifier
Additional Information	http://www.bucherholz.ch http://www.bucherholz.ch/press/Gewerbepost%20PDF%20Beilage%202015.pdf http://www.holzenergie-wegscheid.de/
Contact	jbagholz@bluewin.ch

Project name	CHP power plant Kokemaki
Project owner	Kokemäen Lämpö Oy
Status	Operational
Start up	2004 (constructed)
Country	Finland
City	Kokemäki
Type	TRL 9 Commercial
Technology	Fuel gas (heat)
Raw Material	Biomass residues, sawdust to large chips
Output 1 Name	Heat
Output 1 Capacity	6
Output 1Unit	MWth
Partners	Condens Oy (2004-2008)
Technology Brief	Condens Oy and VTT developed a new type of fixed-bed gasifier based on forced fuel flow. The first small-scale CHP plant based on Novel fixed-bed gasification was constructed in 2004 in Kokemäki (supplier Condens Oy). The gasifier operated with a wide range of biomass residues from sawdust to large chips. The plant was equipped with a complete gas-cleaning train consisting of a gas reformer, a filter and a scrubber for removing residual nitrogen compounds. Three 0.6 MW gas engines were installed for power production and a gas boiler for heat recovery. The test runs were completed in 2007. The Novel-technology was planned for combined heat and power application but the generation of electricity didn't work out as was planned. Condens Oy withdrew from the project in 2008 and the facilities remained to district heating company, Kokemäen Lämpö Oy. The company (Kokemäen Lämpö) took possession of the gasification plant and now the plant work as a 7,2 MW district heating plant.
Contact	Kokemäen Lämpö Oy, CEO Jukka Järvenpää Tel. +358 400 637 543

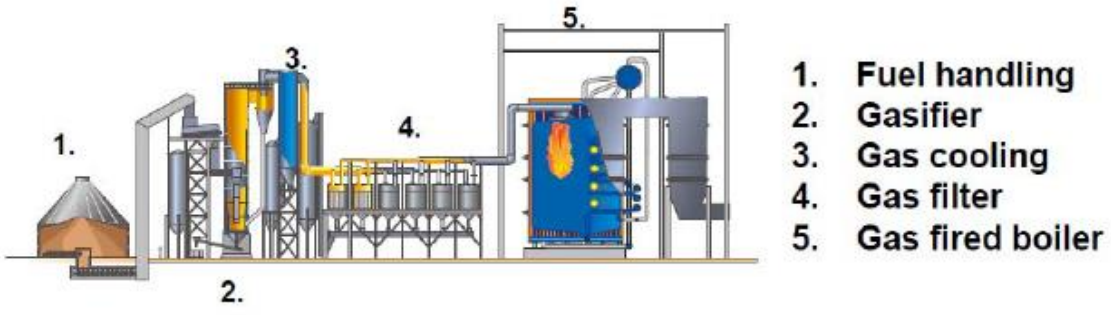


Project name	Kuntschar Wolfshagen
Project owner	Kuntschar Wolfshagen
Status	Operational
Start up	2006
Country	Germany
City	Wolfhagen
Type	TRL 9 Commercial
Technology	Power / CHP
Raw Material	Wood pellets, wood chips
Output 1	Power (electricity) (0,2 MWel)
Output 2	Heat (0,27 MWth)
Partners	Kuntschar Energieerzeugung GmbH
Technology Brief	Fixed bed gasifier
Contact	info@kuntschar-holzgas.de +49(0)5692 997739-0

Project name	KWS Landshut
Project owner	KWS Landshut
Status	Operational
Start up	2014
Country	Germany
City	Landkreis Forchheim
Type	TRL 9 Commercial
Technology	Power / CHP
Raw Material	Wood pellets
Output 1	Power (electricity) (0,3 MWel)
Output 2	Heat (0,45 MWth)
Partners	KWS Strohmenger Gmbh
Technology Brief	Fixed bed gasifier
Contact	Tel. +49 - 9134 - 9962 - 0 Fax. +49 - 9134 - 996226 mail: info@kws-strohmenger.de

Project name	KWS Ostalb
Project owner	KWS Ostalb
Status	Operational
Start up	2013
Country	Germany
City	Ostalbkreis
Type	TRL 9 Commercial
Technology	Power / CHP
Raw Material	Wood pellets
Output 1	Power (electricity) (0,3 MWel)
Output 2	Heat (0,45 MWth)
Partners	KWS Strohmenger Gmbh
Technology Brief	Fixed bed gasifier
Contact	Tel. +49 - 9134 - 9962 - 0 Fax. +49 - 9134 - 996226 mail: info@kws-strohmenger.de

Project name	Kymijärvi II
Project owner	Lahti Energia Oy
Status	Operational
Start up	2012
Country	Finland
City	Lahti
Type	TRL 9 Commercial
Technology	CHP
Raw Material	SRF
Output 1 Name	Power (electricity)
Output 1 Capacity	50
Output 1Unit	MWel
Output 2 Name	Heat
Output 2 Capacity	90
Output 2 Unit	MWth
Partners	Valmet
Technology Brief	The power plant in the Kymijärvi power plant area is based on the CFB gasification technology equipped with innovative gas cooling and cleaning system before combusting the product gas in a specially designed gas fired boiler. Valmet delivered the CFB gasification process, plus gas cooling and cleaning, steam boiler and flue gas cleaning system. The SRF is gasified at 850-900 °C in two CFB-gasifier units (2x80 MW) and converted into product gas, the gas is then purified and the resulting clean ecogas is combusted in an ordinary natural gas boiler. The raw material of the SRF is energy-containing waste. In the gasification of SRF, impurities, that cause boiler corrosion, are transferred to the product gas. The product gas is cooled from 900 degrees to about 400 degrees so that materials causing corrosion turn from gas into solid particles. Then, the solid particles can be filtered out so that the resulting gas is clean. The total fuel input of the plant is 160 MW; the power plant produces 50 MW of electricity and 90 MW of district heat for the city of Lahti.
Additional Information	Juhani Isakkson, Valmet; Hemmo Takala, Lahti Energia Oy
Contact	juhani.isaksson@valmet.com, tel. +358 40 8304402



Project name	
Project owner	Lamprecht GmH
Status	Operational
Start up	2015
Country	Italy
City	Kastelbell
Type	TRL 9 Commercial
Technology	CHP
Raw Material	Wood chips
Output 1 Name	Power (electricity)
Output 1 Capacity	0,199
Output 1Unit	MWel
Output 2 Name	Heat
Output 2 Capacity	0,320
Output 2 Unit	MWth
Partners	Urbas
Technology Brief	Urbas gasifier container type. A combustible gas, wood gas, is drawn from wood through a means of thermochemical processes which take place in a specially designed reactor. The raw gas is then separated of dust and tars through a filtering system. This cleaned gas is then used to produce combined heat and power through a gas engine + generator. Unlike other CHP technologies which are based on the combustion of biomass, and require a working medium, (water in a steam turbine, heat oil in the ORC-process) wood gas cogeneration requires no intermediate medium thus resulting in a higher electrical efficiency throughout the entire system.
Additional Information	
Contact	Oskar Pfeifer info@lamprecht-holz.com

Project name	Ligento Nuernberg
Project owner	Ligento Nuernberg
Status	Operational
Start up	
Country	Germany
City	Nürnberg
Type	TRL 9 Commercial
Technology	Power / CHP
Raw Material	Wood chips
Output 1	Power (electricity) (0.14 MWel)
Output 2	Heat (0,24 MWth)
Partners	Ligento green power GmbH
Technology Brief	Fixed-bed process in cocurrent flow
Contact	info@ligento.de 0911 2403005-0

Project name	Muensterland Energy Gmbh
Project owner	Muensterland Energy Gmbh
Status	Operational
Start up	2011
Country	Germany
City	Ladbergen
Type	TRL 9 Commercial
Technology	Power / CHP
Raw Material	Wood chips, wood pellets
Output 1	Power (electricity) (6 MWel)
Output 2	Heat (8,6 MWth)
Partners	Ligento green power GmbH
Technology Brief	Fixed-bed process in cocurrent flow
Contact	info@muensterland-energy.de; +49 (0) 5485 8348910

Project name	Naturenergie Hersbruck GmbH & Co. KG
Project owner	Naturenergie Hersbruck GmbH & Co. KG
Status	Operational
Start up	2012
Country	Germany
City	Hersbruck
Type	TRL 9 Commercial
Technology	Power / CHP
Raw Material	Wood chips
Output 1	Power (electricity) (0,4 MWel)
Output 2	Heat (1,1 MWth)
Contact	09443 929 - 0

Project name	Micro-scale biomass gasification CHP Volter
Project owner	Nurmes
Status	Operational
Start up	2012
Country	Finland
City	Nurmes
Type	TRL 9 Commercial
Technology	CHP
Raw Material	Wood chips (dry, good quality)
Output 1 Name	Power (electricity)
Output 1 Capacity	0,040
Output 1Unit	MWel
Output 2 Name	Heat
Output 2 Capacity	0,100
Output 2 Unit	MWth
Partners	Volter
Technology Brief	Wood chips are gasified in a downdraft gasifier at 900-1200 C. The product gas is cooled, filtered and wood gas is then burned to provide electricity. The thermal energy produced by the generator is used in a farm to heat water and for drying wood chips.
Additional Information	www.volter.fi http://www.efarm.fi/kohteet/e-farm-kuittilan-tila-nurmes/
Contact	matti.arffman@e-farm.fi +358 44 783 1700

Project name	Wood Gasifier
Project owner	PoliTO
Status	Operational
Start up	
Country	Italy
City	Alessandria
Type	TRL 6-7 Demonstration
Technology	CHP
Raw Material	Forestry waste
Input 1 Name	Wood
Input 1 Capacity	4100
Input 1Unit	t/y
Output 1 Name	Power (electricity)
Output 1 Capacity	0,640
Output 1Unit	MWel
Partners	IPLA
Technology Brief	The process has been developed by poliTO and the system is experimental. The plant is fed with 4100 t/a biomass from forest.
Additional Information	
Contact	Not known

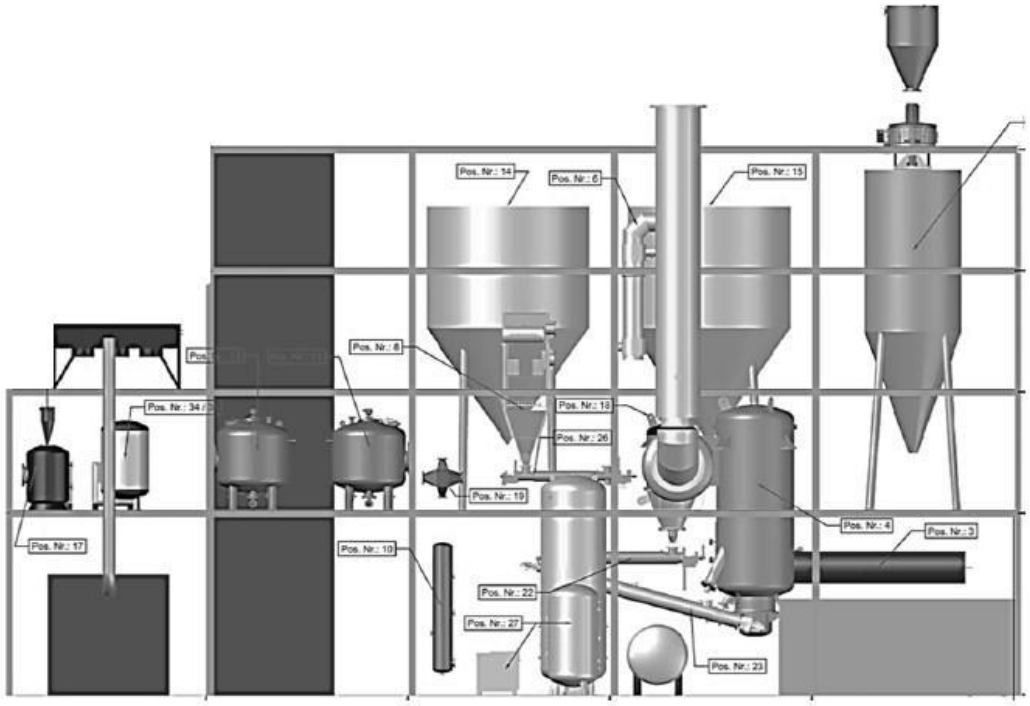
Project name	Pritscher Landshut
Project owner	Pritscher Landshut
Status	Operational
Start up	1995
Country	Germany
City	Landkreis Landshut
Type	TRL 9 Commercial
Technology	Power / CHP
Raw Material	Wood chips
Output 1	Power (electricity) (0,045 MWel)
Output 2	Heat (0,12 MWth)
Partners	Spanner Re² GmbH
Contact	+49 (0) 8773 707 98 288

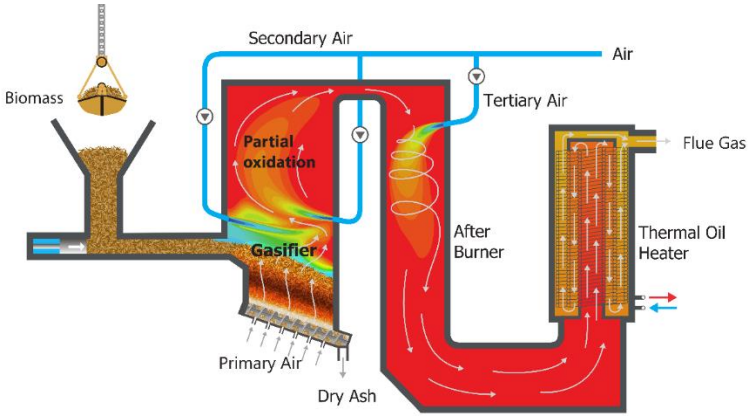
Project name	Qalovis Altenberge
Project owner	Qalovis
Status	Operational
Start up	2012
Country	Germany
City	Altenberge
Type	TRL 9 – commercial
Technology	Power /CHP
Raw Material	Wood pellets Unadulterated wood, residual wood from forestry and landscape wood chips
Output 1	power (electricity) (0.036 MWel)
Output 2	heat (0.12 MWth)
Partners	Qalovis GmbH
Technology brief	Fixed-bed process in cocurrent flow Gas utilization via combustion chamber / Stirling motor
Contact	m.huelscher@qalovis.com info@qalovis.com +49 2505 93626-20 +49 2505 93626-0

Project name	Urbas Balingen
Project owner	Rau GmbH
Status	Operational
Start up	2013
Country	Germany
City	Balingen
Type	TRL 9 Commercial
Technology	CHP
Raw Material	Lignocellulosic crops
Input 1 Name	Wood chips
Output 1 Name	Power (electricity)
Output 1 Capacity	0,250
Output 1Unit	MWel
Output 2 Name	Heat
Output 2 Capacity	0,550
Output 2 Unit	MWth
Partners	Urbas
Technology Brief	A combustible gas, wood gas, is drawn from wood through a means of thermochemical processes which take place in a specially designed reactor. The raw gas is then separated of dust and tars through a filtering system. This cleaned gas is then used to produce combined heat and power through a gas engine + generator. Unlike other CHP technologies which are based on the combustion of biomass, and require a working medium, (water in a steam turbine, heat oil in the ORC-process) wood gas cogeneration requires no intermediate medium thus resulting in a higher electrical efficiency throughout the entire system.
Additional Information	www.urba.at
Contact	Joahim Rau Tel. +49 7433988214

Project name	RegaWatt Abensberg
Project owner	RegaWatt
Status	Operational
Start up	2010
Country	Germany
City	Abensberg
Type	TRL 9 – commercial
Technology	Power/CHP
Raw Material	Lignocellulosics
Output 1	Power (electricity) (2 MWel)
Output 2	Heat (4,3 MWth)
Partners	RegaWatt GmbH
Technology Brief	Fixed bed in countercurrent flow. Gas utilization via motor, gas turbine, combustion chamber
Contact	Phone: 094439290

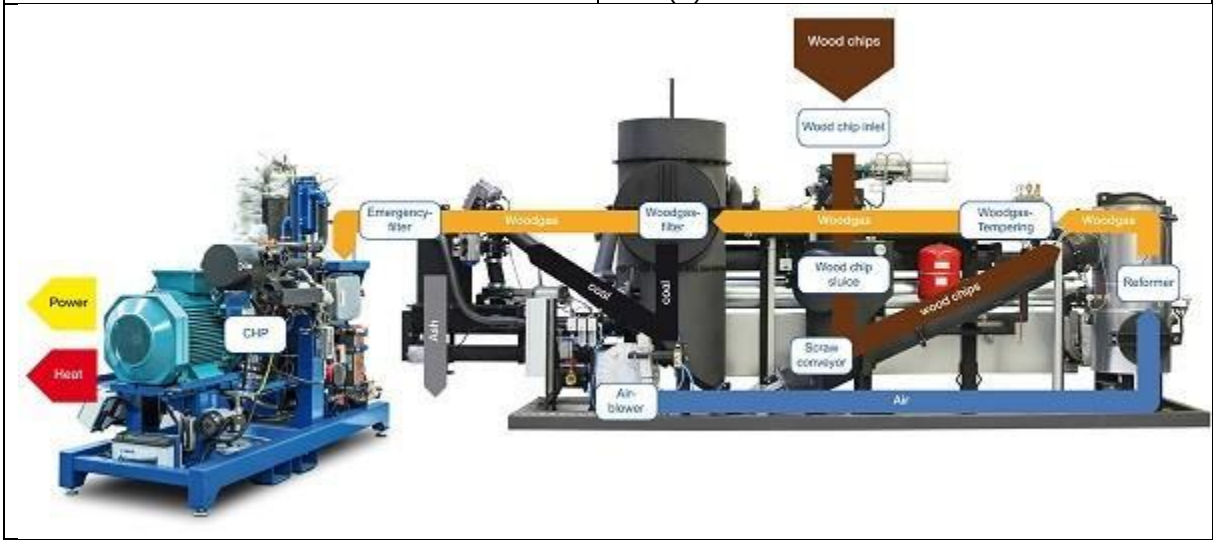
Project name	KSV Koblenz
Project owner	SEK Koblenz
Status	Under construction
Start up	
Country	Germany
City	Koblenz
Type	TRL 8 First-of-a-kind commercial demo
Technology	Power / CHP
Raw Material	Sewage sludge (3 300 t/y)
Output 1	Power (electricity) (0,33 MWel)
Output 2	Heat (0,39 MWth)
Partners	KOPF SynGas GmbH and Co.KG
Technology Brief	Fluidized bed gasification process
Contact	info@kopf-syngas.de Tel.: +49 7071 54954 50 | Fax: +49 7071 54954 60



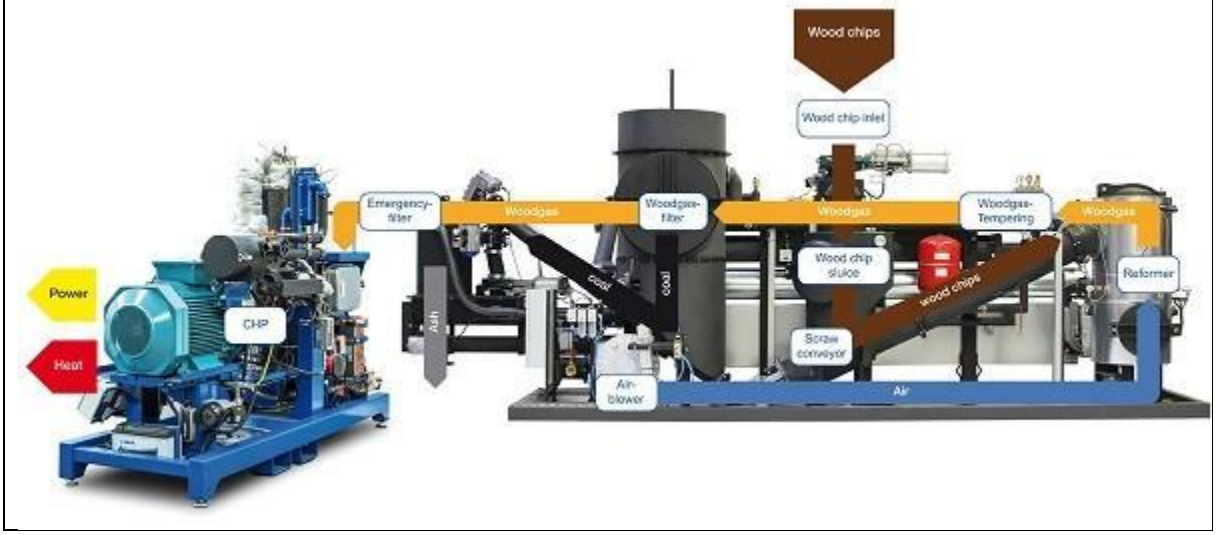
Project name	Dall Energy CHP plant in Sindal - Denmark
Project owner	Sindal District Heating Company
Status	Operational
Start up	2018
Country	Denmark
City	Sindal
Type	TRL8: commercial demo
Technology	Power/CHP
Raw Material	Forestry by-products, wood processing industry by-products, garden & park waste (20-60% moisture content)
Output 1	Electricity (0,8 MWel)
Output 2	Heat (5 MWth)
Total investment explanation	Sindal district heating has been investing about € 9 million in a new biomass fired CHP plant which will supply the town with heat and power from local resources - forest residues and garden waste. The CHP plant itself cost about € 5,5 million while the rest is for building and a new transmission line. The project is a demonstration project supported by the Danish RD&D fund "EUDP"
Technology Brief	The technology is from Dall Energy and consist of - A biomass updraft gasifier with partial oxidation - An afterburner - Thermal oil heater - Scrubber system for recovery of heat The plant is a third generation "Dall Energy Furnace" where the first generation was built in Bogense (Denmark) and second generation built in Sonderborg (Denmark) and Warwick Mills (USA). The first plants have verified that the "Dall Energy Furnace" technology offer a number of advantages for instance - Low cost fuel - 95% less dust - 10-100% load - Low NOx & CO - Low maintenance - Low power consumption
Additional Information	www.dallenergy.com http://www.sindal-varmeforsyning.dk/ https://www.energiforskning.dk/da/project/baeredygtig-biomassekraftvarme-i-sindal https://www.youtube.com/watch?v=MBg-5HLULms https://www.youtube.com/watch?v=rSZQ9i1KdC8 https://www.youtube.com/watch?v=LcBN7xeCOYA https://www.youtube.com/watch?v=5QssvQqXAqA 

	
Contact	Dall Energy Mr. Jens Dall Bentzen Managing director jdb@dallenergy.com www.dallenergy.com

Project name	Spanner Bamberg
Project owner	Spanner Bamberg
Status	Operational
Start up	2011
Country	Germany
City	Landkreis Bamberg
Type	TRL 9- commercial
Technology	Power/CHP
Raw Material	Wood pellets, wood chips
Output 1	Power (electricity) (0,045 MWel)
Output 2	Heat (0,12 MWth)
Partners	Spanner Re² GmbH
Technology Brief	According to principles of cogeneration, the Spanner Wood Cogeneration System converts wood chips into biomass electricity and warmth with high efficiency. The systems are run using natural wood chips and provide attractive cost advantages and/or increased power yields according to location and legal conditions. The newly developed, compact wood cogeneration systems HV30-V1.1 and HV45-V1.1 make it possible to fit the systems in rooms with a minimum standard ceiling height of 2.50m. Besides heat insulation, all the heat-carrying components are covered with a resistant coating. A more efficient generator is used for the CHP, which further increases the efficiency of the overall system. Fixed-bed process in cocurrent flow
Contact	+49 (0) 8773 707 98 288



Project name	Spanner Landshut
Project owner	Spanner Landshut
Status	Operational
Start up	2011
Country	Germany
City	Landkreis Landshut
Type	TRL 9- commercial
Technology	Power/CHP
Raw Material	Wood chips
Output 1	Power (electricity) (0,025 MWel)
Output 2	Heat (0,5 MWth)
Partners	Pritscher Holzgas GmbH
Technology Brief	Fixed-bed process in cocurrent flow (Spanner)
Contact	pritscher@freenet.de 0049 (0)8773 200



Project name	CHP Arnsberg-Wildhausen
Project owner	Stadtwerke Duesseldorf
Status	Operational
Start up	2016
Country	Germany
City	Arnsberg-Wildhausen
Type	TRL 9 Commercial
Technology	CHP
Raw Material	Lignocellulosic crops
Output 1 Name	Power (heat)
Output 1 Capacity	0,27
Output 1Unit	MWel
Output 2 Name	Heat
Output 2 Capacity	0,41
Output 2Unit	MWth
Technology Brief	fixed bed downdraft gasifier, air blown
Partners	Biomass Engeneering Ltd., UK; Biomass Energiesyteme, Dortmund;
Contact	Thomas Nemitz tnemitz@swd-ag.de

Project name	CHP Urbas Konstanz
Project owner	STADTWERKE KONSTANZ GmbH
Status	Operational
Start up	2011
Country	Germany
City	Konstanz
Type	TRL9 Commercial
Technology	CHP
Raw Material	Wood chips
Output 1 Capacity	Power (electricity)
Output 1Unit	0,140
Output 2 Name	MWel
Output 2 Capacity	Heat
Output 2 Unit	0,300
Output 3 Name	MWth
Partners	Urbas
Technology Brief	A combustible gas, wood gas, is drawn from wood through a means of thermochemical processes which take place in a specially designed reactor. The raw gas is then separated of dust and tars through a filtering system. This cleaned gas is then used to produce combined heat and power through a gas engine + generator. Unlike other CHP technologies which are based on the combustion of biomass, and require a working medium, (water in a steam turbine, heat oil in the ORC-process) wood gas cogeneration requires no intermediate medium thus resulting in a higher electrical efficiency throughout the entire system.
Additional Information	www.urbas.at
Contact	DI Olaf Westerhoff Tel.: +49 7531 803 226

Project name	CHP Stadtwerke Rosenheim
Project owner	Stadtwerke Rosenheim GmbH
Status	Operational
Start up	2015
Country	Germany
City	Rosenheim
Type	TRL 9 Commerical
Technology	CHP
Raw Material	Wood chips
Output 1 Capacity	42
Output 1Unit	kg/h
Output 1 Name	Power (electricity)
Output 1 Capacity	0,050
Output 1Unit	MWel
Output 2 Name	Heat
Output 2 Capacity	0,095
Output 2 Unit	MWth
Technology Brief	Development since 2007. Fluidized bed reactor, combination of concurent and eddy flow, gas utilization via motor.
Contact	Rolf Waller rolf.waller@swro.de

Project name	
Project owner	Steiner A. & Cie AG
Status	operational
Start up	2013
Country	Switzerland
City	Ettiswill
Type	TRL 9 Commercial
Technology	Power/CHP
Raw Material	Lignocellulosic crops
Input 1 Name	Wood chips
Output 1 Name	Power (electircity) (0,045 MWth)
Output 2 Name	Heat (0,105 MWth)
Technology Brief	Downdraft Spanner gasifier
Contact	Urs Steiner steiner-saegerei@bluewin.ch

Urs Steinger, Betriebsleiter des Sägewerks Riedbrugg in Ettiswil, vor der Holzvergaseranlage.
Bild Boris Bürgisser

Project name	SynCraft Stadl
Project owner	SynCraft
Status	Operational
Start up	2011
Country	Austria
City	Stadl an der Mur
Type	TRL 9 – commercial
Technology	Power /CHP
Raw Material	Wood chips (1,3 MWth)
Output 1 Name	Power (electricity) (0,4 MWel)
Output 2 Name	Heat (0,615 MWth)
Technology Brief	Staged floating-fixed-bed gasifier. The system is designed to cover the entire heat base load of the local district heating network. It is used for commercial woodchips, including bark and fine particles. This allows the plant to be operated economically and, with a fuel utilization level of 92%, will provide both heat and, above all, an above-average power output of around 30%. The heat flows directly into Stadl's district and district heating network - the electricity flows into the regional grid. In sum, the biomass HFC will produce 2.5 million kilowatt hours of electricity and about 5.9 million kilowatt hours of heat a year. In addition to the outstanding yield, the operators of the Bio-Nahwärme Stadl also enthuse the unique by-product of the active carbon or charcoal, which is only achieved by the patented technology of SYNCRAFT® Das Holzkraftwerk is possible. This closes the ecological cycle of CO2-neutral energy production. Thus, SYNCRAFT® was able to convince the operators of Stadtwerke Murau and another wood power plant with 500 kW electrical power is planned.
Contact	marcel.huber@syncraft.at

Project name	SynCraft Schwaz
Project owner	SynCraft
Status	Operational
Start up	2009
Country	Austria
City	Schwaz
Type	TRL 9 – commercial
Technology	Power /CHP
Raw Material	Wood chips
Output 1 Name	Power (electricity) (0,1 MWel)
Output 2 Name	Heat (0,5 MWth)
Technology Brief	The biomass co-generation plant SYNCRAFT®Werk Alpha was founded on site of Stadtwerke Schwaz in 2009 and has since served as the development platform of the floating bed gasification technology. At this plant, the continuous development of our technology takes place together with our project partners and the MCI - Internationale Hochschule Gmbh. Also the use of alternative, biogenic raw materials such as bark, straw and waste wood is studied and researched in depth. The plant has a thermal capacity of about 500kW and now allows operation without supervision.
Contact	marcel.huber@syncraft.at
	www.syncraft.at

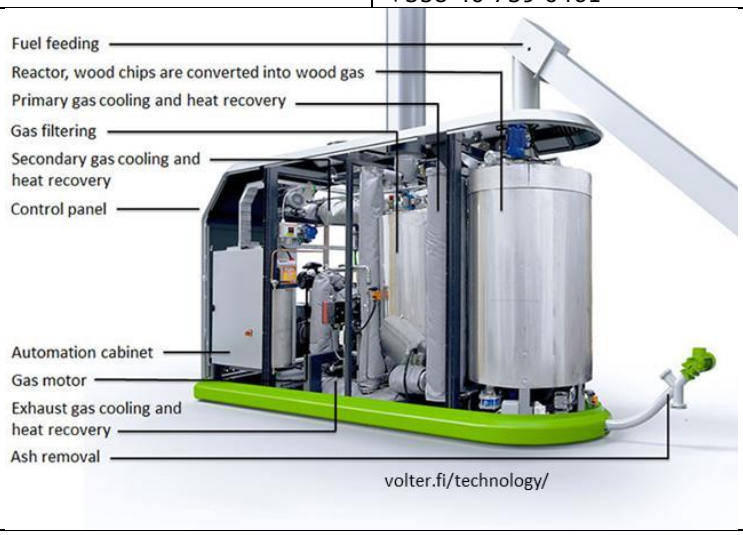
Project name	SynCraft Hatlerdorf
Project owner	SynCraft
Status	Operational
Start up	2014
Country	Austria
City	dornbirn
Type	TRL 9 – commercial
Technology	Power /CHP
Raw Material	Wood chips (0,65 MWth)
Output 1 Name	Power (electricity) (0,25 MWel)
Output 2 Name	Heat (0,35 MWth)
Technology Brief	Staged floating fixed-bed gasifier. SYNCRAFT®Werk Dornbirn makes use of commercially available, dried wood chips (G30 / G50), including barks and fines. The power generation of the product gas takes place in an agenitor 406 gas engine of 2G with an electrical efficiency of 40%.
Contact	marcel.huber@syncraft.at
	www.syncraft.at

Project name	SynCraft Vierschach
Project owner	SynCraft
Status	Operational
Start up	2014
Country	Austria
City	Vierschach
Type	TRL 9 – commercial
Technology	Power /CHP
Raw Material	Wood chips (0,95 MWth)
Output 1 Name	Power (electricity) (0,3 MWel)
Output 2 Name	Heat (0,4 MWth)
Technology Brief	Staged floating-fixed-bed gasifier. SYNCRAFT®Werk Vierschach makes use of commercially available, dried wood chips (G30 / G50), including barks and fines. The power generation of the product gas takes place in an agenitor 312 gas engine of 2G, which was specially developed for the efficient processing of wood-gas and promises the highest efficiency.
Contact	marcel.huber@syncraft.at
	www.syncraft.at

Project name	CraftWerk Innsbruck
Project owner	SynCraft
Status	Operational
Start up	2016
Country	Austria
City	Innsbruck
Type	TRL 9 – commercial
Technology	Power /CHP
Raw Material	Wood chips (0,9 MWth)
Output 1 Name	Power (electricity) (0,26 MWel)
Output 2 Name	Heat (0,4 MWth)
Technology Brief	Staged floating fixed-bed gasifier. The turbo-charged CHP unit with 8 cylinders and 16.7-liter capacity already achieved an electrical output of 300 kW in the first week after commissioning in November 2016.
Contact	marcel.huber@syncraft.at
	www.syncraft.at

Project name	CHP Demonstrationsanlagen URBAS
Project owner	Urbas Energietechnik
Status	Operational
Start up	2001
Country	Austria
City	Ruden
Type	TRL 6-7 Demonstration
Technology	CHP
Raw Material	Wood chips
Output 1 Name	Power (electricity)
Output 1 Capacity	0,150
Output 1Unit	MWel
Output 2 Name	Heat
Output 2 Capacity	0,300
Output 2 Unit	MWth
Partners	Urbas Stahl&Anlagenbau, Voelkermarkt
Technology Brief	A combustible gas, wood gas, is drawn from wood through a means of thermochemical processes which take place in a specially designed reactor. The raw gas is then separated of dust and tars through a filtering system. This cleaned gas is then used to produce combined heat and power through a gas engine + generator. Unlike other CHP technologies which are based on the combustion of biomass, and require a working medium, (water in a steam turbine, heat oil in the ORC-process) wood gas cogeneration requires no intermediate medium thus resulting in a higher electrical efficiency throughout the entire system.
Additional Information	
Contact	Ing. Peter Urbas DI Wolfgang Felsberger Tel.+43 4232 25210

Project name	Kempele Ecovillage
Project owner	Volter
Status	Operational
Start up	2009
Country	Finland
City	Kempele
Type	TRL 4-5 Pilot
Technology	CHP
Raw Material	Wood chips (dry, good quality)
Output 1 Name	Power (electricity)
Output 1 Capacity	0,300
Output 1Unit	MWel
Output 2 Name	Heat
Output 2 Capacity	0,800
Output 2 Unit	MWth
Partners	Volter
Technology Brief	The power plant first converts the wood chips to wood gas, which is then burned to provide electricity. The thermal energy produced by the generator is used to heat water, which warms the houses as it passes through pipes in the floors. The energy created suffices to provide the ten houses with heat and electricity all year round. A windmill stands ready to supply extra power in case the power plant falls short. The ecovillage concept represents a remarkable achievement in an area where winter temperatures can reach minus 40 degrees.
Additional Information	www.volter.fi
Contact	Jarno Haapakoski, Volter +358 40 739 0461



Project name	CHP Grossenhain
Project owner	Waermeversorgung Grossenhain /POW AG
Status	Operational
Start up	
Country	Germany
City	Grossenhain
Type	TRL 9 – commercial
Technology	Power/CHP
Raw Material	Lignocellulosics
Output 1	Power (electricity) (6 MWel)
Output 2	Heat (21 MWh)
Partners	VER Verfahrensingenieure GmbH, Dresden
Technology Brief	CombiPower Process; FB;
Additional Information	air blown; preheated air up to 620Â°C; oxygen enrichment up to 50 % by volume;

Project name	Wegscheid Aschaffenburg
Project owner	Wegscheid Aschaffenburg
Status	Operational
Start up	2011
Country	Germany
City	Landkreis Aschaffenburg
Type	TRL 9 – commercial
Technology	Power /CHP
Raw Material	Wood pellets, wood chips
Output 1	Power (electricity)(0,12 MWel)
Output 2	Heat (0,23 MWth)
Partners	Holzenergie Wegscheid GmbH
Technology Brief	Fixed-bed process in cocurrent flow
Contact	Tel. +49 (0) 8584 98861-0 E-Mail: info@holzenergie-wegscheid.de

Project name	Wegscheid Bamberg
Project owner	Wegscheid Bamberg
Status	Operational
Start up	2011
Country	Germany
City	bamberg
Type	TRL 9 – commercial
Technology	Power /CHP
Raw Material	Wood pellets, wood chips
Output 1	Power (electricity)(0,12 MWel)
Output 2	Heat (0,23 MWth)
Partners	Holzenergie Wegscheid GmbH
Technology Brief	Fixed-bed process in cocurrent flow
Contact	Tel. +49 (0) 8584 98861-0 E-Mail: info@holzenergie-wegscheid.de

Project name	Wegscheid Bayreuth
Project owner	Wegscheid Bayreuth
Status	Operational
Start up	2011
Country	Germany
City	Bayreuth
Type	TRL 9 – commercial
Technology	Power /CHP
Raw Material	Wood pellets, wood chips
Output 1	Power (electricity)(0,12 MWel)
Output 2	Heat (0,23 MWth)
Partners	Holzenergie Wegscheid GmbH
Technology Brief	Fixed-bed process in cocurrent flow
Contact	Tel. +49 (0) 8584 98861-0 E-Mail: info@holzenergie-wegscheid.de

Project name	Wegscheid Demo
Project owner	Wegscheid demo
Status	Operational
Start up	2009
Country	Germany
City	Wegscheid
Type	TRL 6-7 Demo
Technology	Power /CHP
Raw Material	Wood pellets, wood chips
Output 1	Power (electricity)(0,12 MWel)
Output 2	Heat (0,23 MWth)
Partners	Holzenergie Wegscheid GmbH
Technology Brief	Fixed-bed process in cocurrent flow
Contact	Tel. +49 (0) 8584 98861-0 E-Mail: info@holzenergie-wegscheid.de

Project name	Wegscheid Passau
Project owner	Wegscheid Passau
Status	Operational
Start up	2009
Country	Germany
City	Landkreis Passau
Type	TRL 9 - commercial
Technology	Power /CHP
Raw Material	Wood pellets, wood chips
Output 1	Power (electricity)(0,12 MWel)
Output 2	Heat (0,23 MWth)
Partners	Holzenergie Wegscheid GmbH
Technology Brief	Fixed-bed process in cocurrent flow
Contact	Tel. +49 (0) 8584 98861-0 E-Mail: info@holzenergie-wegscheid.de

Project name	WUN Bioenergy
Project owner	WUN Bioenergy
Status	Operational
Start up	2012
Country	Germany
City	Schönbrunn
Type	TRL 9 – commercial
Technology	Power/CHP
Raw Material	Wood pellets, wood chips
Output 1	Power (electricity) (0,36 MWel)
Output 2	Heat (0,54 MWth)
Partners	Burkhardt
Technology Brief	Fluidized bed process in cocurrent flow. ORC turbine, heat used for wood pellets production.
Contact	Tel 09232 - 88 77 00 Fax 09232 - 88 77 20 info@wun-bioenergie.de