IEA Bioenergy
Technology Collaboration Programme

Status report on thermal gasification of biomass and waste 2021

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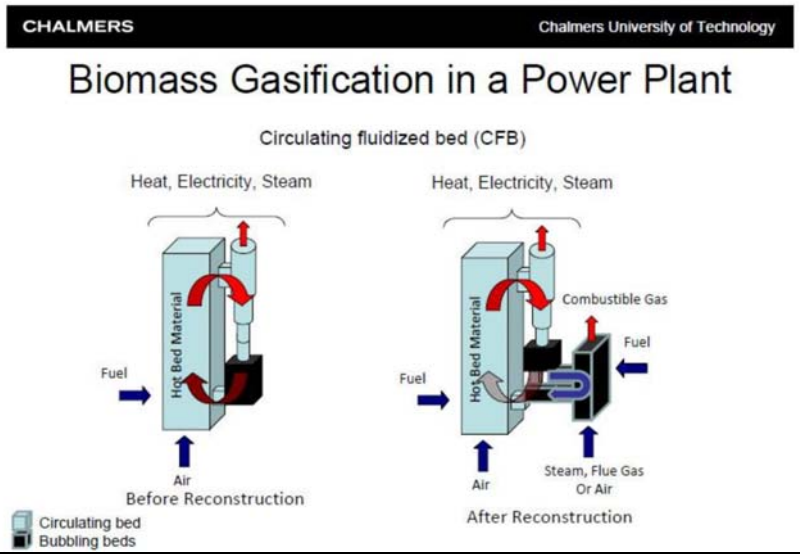
Annex 5
Other gasification technology – operational / commissioning / erection / planned

	Operational
	Commissioning
	Erection
	Planned

	Owner	Project name	Country	Page
	Chalmers Technical University	Centre for Indirect Gasification of Biomass	SE	3
	Cortus AB	WoodRoll Demo	SE	4
	Cortus Energy AB	Probiostal	SE	5
	co-Ver Energy Holding	Lake Maggiore Tecnoparco	IT	6
	DBI-Virtuhcon GmbH	FlexiEntrained (GSP) Pilot plant	DE	7
	Dillinger Saar GmbH	Project Selma	DE	8
	ECN	Milena Gasifier	NL	9
	Eska Graphic Board	Waste Paper Rejects Gasification	NL	10
	ICQ/SIAG/ERBA	-	IT	11
	Ilomantsin Laempoe Oy	District heating plant	FI	12
	TU Bergakademie Freiberg	FlexiSlag Pilot Plant	DE	13
	Jalasjaerven Laempoe Oy	District heating	FI	14
	Kauhajoen Laempoehuolto Oy	District heating plant	FI	15
	Kiteen Laempoe Oy	District heating plant	FI	16
	Lahti Energia Oy	Kymijaervi I	FI	17
	Lahti Energia Oy	Kymijaervi II	FI	18
	Metso Fibre	Bioproduct Mill Aanekoski	FI	19
	Metso Fibre Oy, Joutseno Mill	Lime kiln gasifier	FI	20
	OKI Pulp and Paper Mill / APP	OKI	IDN	21
	RISE ETC	PEGB Pilot, FOX	SE	22
	RWE Power AG	MFC within ITZ-CC	DE	23
	Stora Enso	Gasifier at Varkaus paper mill (former Corenso)	FI	24
	Stora Enso	Lime kiln gasifier	FI	25

	TU Dresden	TC2 Process	DE	26
	TU Freiberg	FlexiCOORVED Pilot Plant	DE	27
	Turku energia and Gasek Oy	Wood gasification facility to generate steam for industrial laundry in Turku	FI	28
	Vaskiluodon Voima Oy, Vaasa	Vaskiluodon Voima Biomass Gasification Plant	FI	29
	VTT Technical Research Centre of Finland Ltd	Dual fluidized-bed steam gasification pilot plant	FI	30
	Xylowatt, University Catholic of Louvain-la-Neuve (UCL)	Test Gasifier Plant TGP	BE	31
	ZAB Balingen	KSV Balingen	DE	32

Project name	Centre for Indirect Gasification of Biomass
Project owner	Chalmers Technical University
Status	Operational
Start up	2008
Country	Sweden
City	Göteborg
Type	TRL 4-5 Pilot
Technology	Other gasification Technology R&D activity with no dedicated product
Raw Material	Lignocellulosic crops
Input 1 Name	Woody biomass
Output 1 Name	Heat
Output 1 Capacity	4
Output 1Unit	MWth
Partners	Göteborg Energi, Metso Power, Akademiska hus
Technology Brief	The idea is to combine an existing CFB co-generation boilers with an indirect gasification system, drawing hot sand from the combustor of the CFB boiler to the piggy-back gasifier and recirculating char and cold sand back from this unit
Additional Information	www.chalmers.se
Contact	Henrik Thunman ph:+46 31 772 11451 email henrik.thunman@chalmers.se



Project name	WoodRoll Demonstration
Project owner	Cortus (2) AB
Status	Operational
Start up	2018
Country	Sweden
City	Köping
Type	TRL 4-5 Pilot
Technology	Fuel gas (Heat)
Raw Material	Lignocellulosic crops
Input 1 Name	Woody biomass
Input 1 Capacity	100
Input 1Unit	kg/h
Output 1 Name	Heat
Output 1 Capacity	0,5
Output 1Unit	MWth
Partners	Nordkalk AB, Cortus AB, Torkapparater AB, Saxlund AB, Calderys AB, Siemens AB, Kanthal AB, ÅF AB, Sandvik AB.
Technology Brief	The concept is based on three stages and the thermal integration between these to achive an indirect gasification resulting in a tar-free, MCV gas without using neither air nor oxygen. The pilot plant has been operated stagewise with limited integration. As of late 2015, all the three stages process stages are fully integrated into a pilot plant representing the concept. The wet biomass fuel is first dried using flue gas in the lower temperature range from the combustion of part of the pyrolysis gas. In the pyrolyser, the fuel is decomposed thermally to pyrolysis gas and char, the heat beeing provided by the flue gas from the combustion of the pyrolysis gas in the higher temperature range. The char is milled and injected as a powder into the gasifier by steam. The gasifier operates at very high temperature. The heat required for the gasification of the char is provided indirectly by burning the pyrolysis gas in recuperative burners, transferring heat by radiation to the gasification chamber. In this way, the char is gasified with steam only such that the product gas is free from tar, low in methane and has no dilution by nitrogen such that it reaches an MCV heat content. The gasifier gas is then cooled to generate the steam required in the gasifier. The hot flue gases remaining after the combustion is routed to the pyrolyser and then the dryer for indirect heating of these units.
Additional Information	www.cortus.se
Contact	Rolf Ljunggren ph: +46 70 694 4898 email: rolf.ljunggren@cortus.se

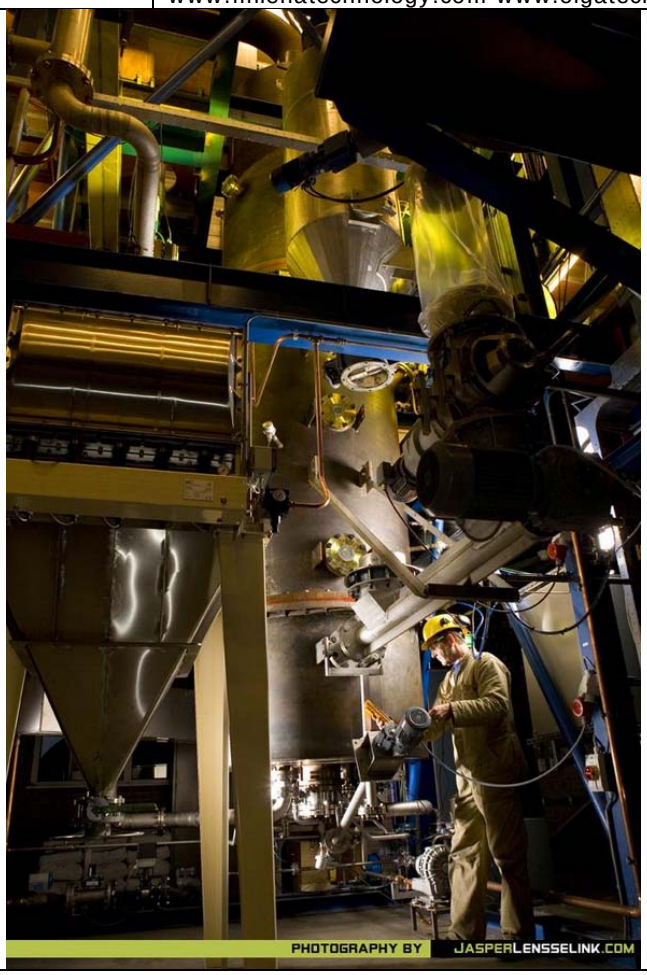
Project name	Probiostal
Project owner	Cortus Energy AB
Status	Commissioning
Start up	2018
Country	Sweden
City	Honagas
Type	TRL 8 First-of-a-kind- commercial demo
Technology	Fuel gas (heat)
Raw Material	Forest residues
Input 1 Name	Forestry waste
Output 1 Name	Heat
Output 1 Capacity	6
Output 1Unit	MWth
Output 2	Biochar for use in steel process
Partners	ABB, Calderys, Hoeganaes AB, Soedra skogsaegarna, Sveaskog, SSAB och Outokumpu
Technology Brief	Cortus WoodRoll process
Additional Information	http://www.cortus.se/honagas.html
Contact	Rolf Ljunggren rlj@cortus.se +46(0)8 588 866 30

Project name	Lake Maggiore Tecnoparco
Project owner	co-Ver Energy Holding
Status	Operational
Start up	2008
Country	Italy
City	Verbania
Type	TRL 9 Commercial
Technology	Other gasification technology
Raw Material	Wood chips
Output 1 Name	Power (electricity)
Output 1 Capacity	0,250
Output 1Unit	MWel
Technology Brief	Pyrogasifier Ultra high gasification temperature
Additional Information	http://www.co-ver-energy.it/comunicazione/discoverymagazine/Magazine_CO-VER_Energy_Holding_10.08.pdf
Contact	CO-VER Energy Holding Headquarters Via 42 Martiri, 165 28924 Verbania (VB) Italy Phone +39 0323 585511 Fax +39 0323 585535 coverenergyholding@co-ver-energy.it

Project name	FlexiEntrained (GSP) Pilot plant
Project owner	DBI-Virtuhcon GmbH
Status	Operational
Start up	2018
Country	Germany
City	Freiberg
Type	TRL 4-5 Pilot
Technology	Fuel Gas (Heat)
Technology additional information	Entrained flow gasifier
Raw Material	other
Input 1	Hard coal, lignite, biomass, coke, char, municipal waste, sewage sludge, RDF (450 kg/h)
Output 1	heat (5 MWth)
Partners	Institute of Energy Process Engineering (IEC), TU Bergakademie Freiberg
Technology Brief	26 bar(g), water-cooled cooling screen, spray quench system, Sulfurox plant, waste water treatment, pneumatic feeding test rig
Contact	info-evt@iec.tu-freiberg.de

Project name	Project Selma
Project owner	Dillinger Saar GmbH
Status	Planned
Country	Germany
City	Premnitz
Type	TRL 9 Commercial
Technology	Other Gasification Technology
Raw Material	other
Input 1	waste materials
Output 1	hydrogen (2,200 t/y)
Technology Brief	Plasma gasification
Contact	info@plagazi.com

Project name	MILENA Gasifier
Project owner	ECN
Status	Operational
Country	NL
City	Petten
Type	TRL 4-5 Pilot
Technology	Other Gasification Technology
Raw Material	other
Input 1	Wood, waste
Output 1	clean syngas (200 m3/h)
Output additional information	Tar free producer gas
Partners	ECN
Technology Brief	Indirect gasification (MILENA-technology), gas cooler, cyclone, OLGA tar removal, water scrubber, gas boiler
Additional Information	Related publications http://www.ecn.nl/docs/library/report/2011/m11078.pdf http://www.ecn.nl/docs/library/report/2011/m11078.pdf http://www.ecn.nl/docs/library/report/2011/m11078.pdf http://www.ecn.nl/docs/library/report/2011/m11078.pdf
Contact	Christiaan van de Meijden vandermeijden@ecn.nl www.ecn.nl www.milenatechnology.com www.olgatechnology.com



Project name	Waste Paper Rejects Gasification
Project owner	Eska Graphic Board
Status	Operational
Start up	2017
Country	The Netherlands
City	Hoogezand
Type	TRL 9 Commercial
Technology	Other gasification technolgy
Raw Material	Paper reject
Input 1 Capacity	3-3,5
Input 1Unit	t/h
Output	Heat
Output Capacity	12
Output Unit	MWth
Technology Brief	Gasification based on air blown Circulating Fluidised Bed (CFB) technology operating at atmospheric pressure. Produced syngas is combusted in waste heat recovery boiler to produce saturated steam.
Contact	Bodewes, Bert <B.Bodewes@eskagraphicboard.com>

Project name	
Project owner	ICQ/SIAG/ERBA
Status	Operational
Start up	2009
Country	Italy
City	Torre S.Susanna
Type	TRL 6-7 Demonstration
Technology	Other gasification technology (Pyrogasifier)
Raw Material	Wood chips
Output 1 Name	Power (electricity)
Output 1 Capacity	0,500
Output 1Unit	MWel
Output 2 Name	Heat
Output 2 Capacity	2
Output 2 Unit	MWth
Technology Brief	It is a biomass plants with syngas production from molecular dissociation and pyrogasification of woodchips for a total power of gas generated amounting to 2,000 kWth.The Torre Santa Susanna plant was carried out inside a project financed by PON (National Operative Plan). The aim of the project was the development and the optimisation of a biomass gasification process carried out in three phase: drying, pyrolysis and gasification, and an high quality syngas production to use in internal combustion engine.
Additional Information	http://77.43.21.234/files/files_news2/00034.pdf
Contact	Tel.: 39 (0) 6 8404301 Fax: 39 (0) 6 840430231 info@gruppoicq.com

Project name	Ilomantsi district heating
Project owner	Ilomantsin Lämpö Oy
Status	Operational
Start up	1996
Country	Finland
City	Ilomantsi
Type	TRL 9 Commercial
Technology	Fuel gas (heat)
Raw Material	peat, wood chips
Output 1 Name	Heat
Output 1 Capacity	6
Output 1Unit	MWth
Technology Brief	The biomass (peat,wood chips) is gasified in two updraft fixed bed gasifiers. The product gas is combusted in a boiler.
Additional Information	
Contact	Ilomantsin Lämpö Oy Tel .+358 13882373

Project name	FlexiSlag Pilot Plant
Project owner	Institute of Energy Process Engineering and Chemical Engineering (IEC), TU Bergakademie Freiberg
Status	Operational
Start up	2013
Country	Germany
City	Freiberg
Type	TRL 4-5 Pilot
Technology	Fuel Gas (Heat)
Technology additional information	slagging fixed-bed gasifier, 40 bar, BGL reactor
Raw Material	other
Input 1	biomass waste (2 t/h)
Input 2	coal, petcoke (2 t/h)
Input 3	municipal and plastic waste (2 t/h)
Output 1	heat (10 MWth)
Output 2	other (2,300 m3/h)
Output additional information	output 2: Gas
Contact	info-evt@iec.tu-freiberg.de

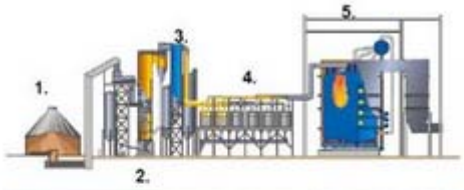
Project name	District heating Jalasjärven
Project owner	Jalasjärven Lämpö Oy
Status	Operational
Start up	1986, new gasifier 2013
Country	Finland
City	Jalasjärven
Type	TRL 9 Commercial
Technology	Fuel gas (heat)
Raw Material	Peat, wood chips, pellets
Output 1 Name	Heat
Output 1 Capacity	6
Output 1Unit	MWth
Technology Brief	The biomass is gasified in a updraft fixed bed gasifier. The product gas is combusted in a boiler. The heating plant generates 6 MW heat.
Additional Information	
Contact	info@jalasjarvenlampo.fi

Project name	District heating plant
Project owner	Kauhajoen Lämpöhuolto Oy
Status	Operational
Start up	1985
Country	Finland
City	Kauhajoki
Type	TRL 9 Commercial
Technology	Fuel gas (heat)
Raw Material	Peat, wood chips
Output 1 Name	Heat
Output 1 Capacity	8+5
Output 1Unit	MWth
Technology Brief	The biomass (peat,wood chips) is gasified in two updraft fixed bed gasifiers. The product gas is combusted in a boiler.
Additional Information	http://www.lampohuolto.fi/
Contact	Kauhajoen Lämpöhuolto Oy Tel. +358 207 459 776

Project name	District heating plant
Project owner	Kiteen Lämpö Oy
Status	Operational
Start up	1986
Country	Finland
City	Kitee
Type	TRL 9 Commercial
Technology	Fuel gas (heat)
Raw Material	Wood chips, sod peat
Output 1 Name	Heat
Output 1 Capacity	6
Output 1Unit	MWth
Technology Brief	The biomass (wood chips, peat) is gasified in a updraft fixed bed gasifier. The product gas is combusted in a boiler. The heating plant generates 6 MW heat.
Additional Information	http://www.kiteenlampo.fi
Contact	Kiteen Lämpö Oy, Ilkka Hämäläinen Tel. +358 50 5988492

Project name	Kymijaervi I
Project owner	Lahti Energia Oy
Status	Operational
Start up	1998
Country	Finland
City	Lahti
Type	TRL 9 Commercial
Technology	Fuel Gas (Heat)
Raw Material	lignocellulosics
Input 1	wood waste
Output 1	heat (70 MWth)
Partners	Amec Foster Wheeler
Technology Brief	The gasifier at Kymijärvi power station is an atmospheric 60 MW CFB gasifier supplied by Amec Foster Wheeler. The gasifier was commissioned in early 1998 and has since then been in commercial operation. The operating temperature in the reactor is typically 800-1000 °C depending on the fuel and the application. The fuel is fed into the lower part of the gasifier above a certain distance from the air distribution grid. The product gas for combustion is led directly from the gasifier through the air preheater to two burners, which are located below the coal burners in the boiler. The gas is combusted in the main boiler and it replaces hard coal in a 360 MWth boiler producing power and district heat. The annual gasifier availability has been over 95 % in each year and the Lahti plant has clearly demonstrated that the technology is technically proven and is able to reduce the emission of CO2, SO2, dust and NOx compared to coal-alone combustion.
Contact	Hemmo Takala, Lahti Energia Oy Tel. +358 50 5981221 hemmo.takala@lahtienergia.fi

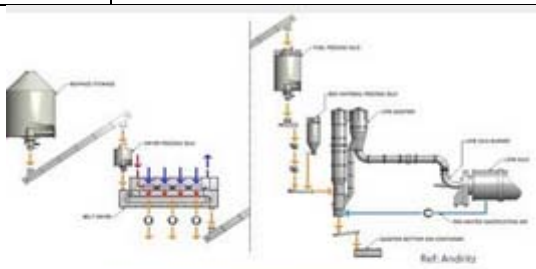
Project name	Kymijaervi II
Project owner	Lahti Energia Oy
Status	Operational
Start up	2012
Country	Finland
City	Lahti
Type	TRL 9 Commercial
Technology	Fuel Gas (Heat)
Raw Material	organic residues and waste streams
Input 1	SRF
Output 1	power (electricity) (50 MWel)
Output 2	heat (90 MWth)
Partners	Valmet
Technology Brief	The power plant in the Kymijaervi 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.
Contact	Juhani Isakkson, Valmet; Hemmo Takala, Lahti Energia Oy juhani.isaksson@valmet.com, tel. +358 40 8304402



1. Fuel handling
2. Gasifier
3. Gas cooling
4. Gas filter
5. Gas fired boiler

Project name	Bioproduct Mill Aanekoski
Project owner	Metso Fibre
Status	Operational
Start up	2017
Country	Finland
City	Äänekoski
Type	TRL 9 Commercial
Technology	Fuel Gas (Heat)
Technology additional information	CFB Valmet
Raw Material	lignocellulosics
Input 1	bark
Input additional information	Bark is produced in the mill when debarking the wood
Output 1	heat (87 MWth)
Output additional information	Product gas used to fire a lime killn in the mill
Additional Information	http://bioproductmill.com/articles/a-unique-bioproduct-mill (Project) http://bioproductmill.com/articles/a-unique-bioproduct-mill (technology)
Contact	juhani.isaksoon@valmet.com

Project name	Lime kiln gasifier
Project owner	Metso Fibre Oy, Joutseno Mill
Status	Operational
Start up	2012
Country	Finland
City	Joutseno
Type	TRL 9 Commercial
Technology	Fuel Gas (Heat)
Raw Material	lignocellulosics
Input 1	bark
Output 1	heat (48 MWth)
Partners	Andritz (supplier)
Technology Brief	The bark is first dried in a belt dryer from Andritz, with an evaporation/drying rate of 12 t/h. The fuel handling system includes an innovative dryer which utilizes the mil excess heat for bark drying. Moisture is reduced from the 50% level
Additional Information	http://spectrum.andritz.com/index/iss_28/art_28_6.htm
Contact	Veli-Matti Pietarinen, Andritz veli-matti.pietarinen@andritz.com Tel: +358 40 8606 523

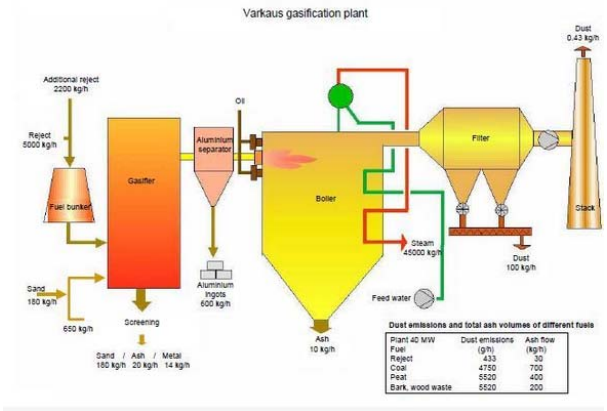


Project name	OKI Pulp and Paper Mill / APP
Project owner	OKI
Status	Operational
Start up	2016
Country	Indonesia
City	Palembang
Type	TRL 9 Commercial
Technology	Other Gasification Technology
Technology additional information	product gas cofiring in a lime kiln
Raw Material	lignocellulosics
Input 1	acasia bark
Input 2	acasia wood
Output 1	heat (110 MWth)
Output 2	heat (110 MWth)
Technology Brief	Valmet delivery includes bark dryers in front of the gasifiers and limekilns using the product gas.
Additional Information	https://www.valmet.com/energyproduction/gasification/biomass-gasification-eliminates-fossil-fuels-in-the-pulp-mill/
Contact	juhani.isaksson@valmet.com

Project name	PEGB Pilot, FOX
Project owner	RISE ETC
Status	2011
Start up	Operational
Country	Sweden
City	Piteå
Type	TRL 4-5 Pilot
Technology	Fuel Gas (Heat)
Technology additional information	Research and development unit, no product
Raw Material	biomass / biomass coal blends
Input additional information	Woody biomass
Output 1	heat (1 MWth)
Output 2	heat (0.02 MWth)
Output additional information	PEGB pilot 1MWth, FOX 20 kW
Partners	MEVA Innovation and IVAB, respectively.
Technology Brief	Presurized entrained flow gasifier and fixed bed gasifier, respectively
Additional Information	https://www.ri.se/en/test-demo/gasification
Contact	Fredrik Weiland (fredrik.weiland@ri.se)

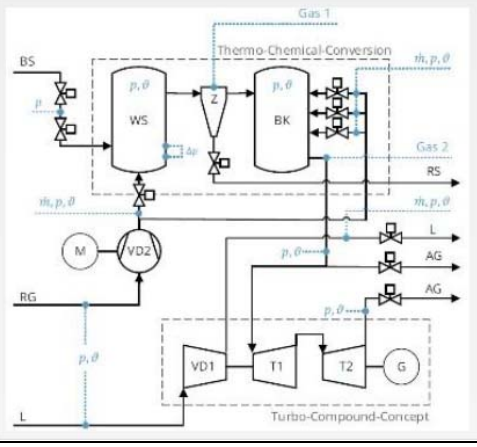
Project name	MFC within ITZ-CC
Project owner	RWE Power AG
Status	Erection
Start up	2022
Country	Germany
City	Bergheim-Niederaussem
Type	TRL 4-5 Pilot
Technology	Other Gasification Technology
Technology additional information	EF, Atmospheric, refractory lined, dip quench, liquid ash discharge
Raw Material	other
Input 1	dried sewage sludge (130 kg/h)
Input 2	dried lignite+sewage sludge (130 kg/h)
Input 3	dried lignite+sewage sludge ash (130 kg/h)
Output 1	clean syngas (700 m3/h)
Output additional information	additional product - Phosphorus
Total Investment Explanation	Incl. Engineering, Assembly, Commissioning and connection plant-site
Funding Explanation	Funding provided by State of North Rhine Westphalia (Ministry of Economics); Total project budget (incl. cost for plant operation): 6.7 Mio. €
Partners	Fraunhofer UMSICHT, Ruhr Universität Bochum
Technology Brief	Supplier: Thermische Apparate Freiberg GmbH; Phosphorus is to be recovered from sewage sludge, most likely as P4 or H3PO4
Additional Information	MFC (Multi Fuel Conversion) within ITZ-CC (Virtuelles Innovations- und Technologiezentrum Carbon Conversion)
Contact	tobias.ginsberg@rwe.com

Project name	Gasifier at Varkaus paper mill (former Corenso)
Project owner	Stora Enso
Status	Operational
Start up	2001
Country	Finland
City	Varkaus
Type	TRL 9 Commercial
Technology	Other Gasification Technology
Raw Material	lignocellulosics
Input 1	Other waste fuels, plastic waste
Output 1	other (50 MWth)
Output additional information	product gas from gasification burned in a boiler
Partners	Stora Enso (former Corenso United Ltd, years 2001-2010)
Technology Brief	Stand-alone gasification plant at Varkaus paper mill in Varkaus, Finland. The commercial application of the atmospheric BFB gasification was first realized in Varkaus by Corenso United Ltd and the 50 MW gasifier was taken into operation in 2001, developed
Contact	Teppo Pakarinen, Stora Enso paper mill Tel. +358 40 585 3294 teppo.pakarinen@storaenso.com



Project name	Lime kiln gasifier Varkaus
Project owner	Stora Enso
Status	Operational
Start up	2008
Country	Finland
City	Varkaus
Type	TRL 9 Commercial
Technology	Other gasification technology
Raw Material	Wood biomass
Output 1 Name	Fuel gas to lime kiln
Output 1 Capacity	12
Output 1Unit	MW
Partners	Amec Foster Wheeler
Technology Brief	The 12 MWth gasifier is providing currently fuel gas to Stora Enso's limekiln at Varkaus. The gasifier is a 12 MWth CFB-unit, which has been running since the end of 2008. It started first as air-blown gasifier in order to produce only the raw gas for the lime kiln. In 2009-2011 the gasifier was mainly operated in the oxygen-steam mode to produce low nitrogen content gas for the BTL demonstration purpose. NSE biofuels Oy, a joint venture between Neste Oil and Stora Enso, opened a demonstration plant at Stora Enso's Varkaus Mill in Finland in 2009. The main goal was to demonstrate Biomass-to-Liquids (BTL) technology which is based on steam-oxygen blown CFB gasification followed by hot filtration and catalytic tar reforming. After completing the successful demonstration programme for Neste Oil and Stora Enso (supplier Foster Wheeler) in 2011, the plant was modified to air-blown operation.
Additional Information	http://www.storaenso.com/
Contact	Juha Palonen, Amec Foster Wheeler Juha.Palonen@fwfin.fwc.com

Project name	TC2 Process
Project owner	TU Dresden
Status	Operational
Start up	
Country	Germany
City	Dresden
Type	TRL 4-5 Pilot
Technology	Other Gasification Technology
Technology additional information	Bubbling fluidized bed gasification First stage: pressurized fluidized gasification, cyclone, combustion chamber Second stage: turbo-compound-concept (identical to gas turbine process)
Raw Material	other
Input 1	sewage sludge
Funding Explanation	Within the framework of national funded projects of the “Sächsische Aufbaubank (SAB)”
Contact	daniel.bernhardt@tu-dresden.de / evt@mailbox.tu-dresden.de



Project name	FlexiCOORVED Pilot Plant
Project owner	TU Freiberg
Status	Operational
Start up	
Country	Germany
City	Freiberg
Type	TRL 4-5 Pilot
Technology	Other Gasification Technology
Technology additional information	Fluidized-bed gasifier, Atmospheric, internal circulated fluidized bed with a moving bed gasification zone, feedstocks with a high ash content.
Raw Material	other
Input 1	sewage sludge as well as biomass-containing waste with high ash content.
Output 1	heat (0.06 MWth)
Contact	info-evt@iec.tu-freiberg.de

Project name	Wood gasification facility to generate steam for industrial laundry in Turku
Project owner	Turku energia and Gasek Oy
Status	Operational
Start up	2013
Country	Finland
City	Turku
Type	TRL 9 Commercial
Technology	Other gasif. technology
Raw Material	Lignocellulosic, wood chips
Output 1 Name	Steam
Output 1 Capacity	1,2
Output 1Unit	MWth
Technology Brief	The gasifier will turn wood chips into gaseous fuel, which are burned in the boiler earlier operated on heavy fuel oil. GASEK's wood gasifier is a co-current gasifier and it's based on the pyrolysis technique. The wood chips are moving in the reactor in the same direction as the gasification air, which is fed in quantities that are considerably lower than is required for combustion. The gasification temperature is 800-1200°C, which prevents formation of damaging tar compounds. This results in tar compounds cracking into lighter fractions.
Additional Information	http://www.gasek.fi/wp-content/uploads/2013/09/Press-Release-GASEK-Turku-Energia-9.9.2013-ID-8718.pdf
Contact	GASEK Oy, tomi.vaananen@gasek.fi , Tel. +358 44 788 8899

Project name	Vaskiluodon Voima Biomass Gasification Plant
Project owner	Vaskiluodon Voima Oy, Vaasa
Status	Opertional
Start up	2012
Country	Finland
City	Vaasa
Type	TRL 9 commercial
Technology	Other gasif. Technology /co-firing
Raw Material	lignocellulosics
Output 1 Name	power
Output 1 Capacity	140
Output 1Unit	MW
Technology Brief	The biomass feedstock is dried in a belt dryer and gasified in a large CFB-gasifier. The product gas after recylce cyclone is directly combusted along with coal in the existing pulverized coal (PC) boiler. Wood gas displaces 25-40 % of coal fuel in the boiler. The Vaskiluoto power plant generates both electricity (230 MW) and heat (170 MW) through co-production
Additional Information	http://issuu.com/codeddesign/docs/vaskiluodon_voima_2013
Contact	Juhani Isaksson, Valmet juhani.isaksson@valmet.com, tel. +358 40 8304402

Project name	Dual Fluidized-Bed steam gasification pilot plant
Project owner	VTT Technical Research Centre of Finland Ltd
Status	Operational
Start up	2013
Country	Finland
City	Espoo
Type	TRL 4-5 Pilot
Technology	Other gasification technology
Raw Material	Biomass; bark, forest residue, wood pellets, other
Output 1 Name	Synthesis gas
Output 1 Capacity	0,35
Output 1Unit	MW
Technology Brief	Dual Fluidized-Bed (DFB) gasifier is used for process development work. Gasifier is atmosheric pressure, with feed capacity up to 80 kg/h. Hot filtration and gas reforming
Additional Information	http://www.vttresearch.com/services/bioeconomy/liquid-biofuels1/methanol-and-methane-based-fuels1/gasification-of-biomass-and-waste
Contact	Esa Kurkela,VTT & Ilkka Hiltunen, VTT esa.kurkela@vtt.fi, +358 40502 6231 ilkka.hiltunen@vtt.fi, +358 400 226730

Project name	Test Gasifier Plant TGP
Project owner	Xylowatt, University Catholic of Louvain-la-Neuve (UCL)
Status	Operational
Start up	2010
Country	Belgium
City	Louvain-la-Neuve
Type	TRL 4-5 Pilot
Technology	Other Gasification Technology
Technology additional information	NOTAR® gasifier pilot plant for R&D
Raw Material	other
Output 1	other (0.15 MW)
Output additional information	syngas
Technology Brief	NOTAR® gasifier is a patented medium scale down-draft gasification technology. It is one of the few process which produces tar-free syngas from biomass. It is designed with a multi stage process and a splitting of the pyrolysis, combustion and reduction zones. This physical separation leads to a compact gasification unit producing a very high-quality syngas. The energy produced from solid biomass is then used as fuel to produce heat and power or for industrial applications.
Additional Information	https://www.xylowatt.com/
Contact	Poskin Pierre-David +32 472 52 96 24

Project name	KSV Balingen
Project owner	ZAB Balingen
Status	operational
Start up	2011
Country	Germany
City	Balingen
Type	TRL 8 First-of-a-kind commercial
Technology	Fuel Gas (Heat)
Raw Material	other
Input 1	Sewage sludge 1 (1,700 t/y)
Input 2	Sewage sludge 2 (300 t/y)
Input 3	Sewage sludge 3 (300 t/y)
Output 1	heat (0.46 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