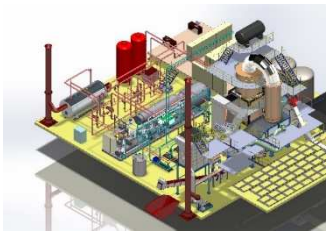
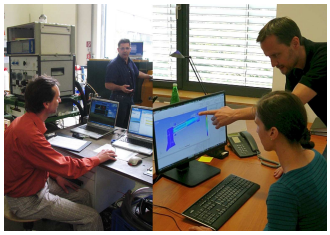
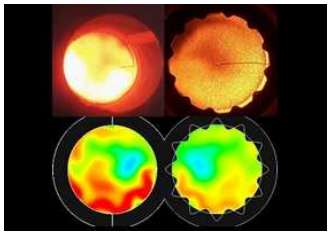
BIOENERGIESYSTEME GmbH

Your partner for energy utilisation from biomass and energy efficiency

Research • Development • Engineering

BIOS BIOENERGIESYSTEME GmbH

REFERENCES






Honored by the government of Styria

8020 Graz, Hedwig-Katschinka-Straße 4, AUSTRIA
T: +43 (316) 481300
office@bios-bioenergy.at | www.bios-bioenergy.at
LG f ZRS Graz, FN 208240 k; UID-Nr. ATU 51448900

SUSTAINABLE ENERGY BIOMASS P Mg Ca K ASH ECONOMY

Index

ENGINEERING OF ENERGY PRODUKTION PLANTS

Industrial process plants, waste heat utilisation and energy efficiency

Heat recovery from a melting oven, Krompachy (Kosicky craj, Slovakia)

Customer:	Kovohuty a.s, SK
Project period:	2020-
Technical specifications:	Nominal thermal capacity: 5.0 MW flue gas / thermal oil heat exchanger; nominal electric capacity: 1.0 MW ORC process
Scope of work:	Preliminary design of the overall plant an Measurement of the gas composition

Plant for the production of high-alumina cement, Wopfing (Lower Austria, Austria)

Customer:	BIO-Brennstoff GmbH, AT
Project period:	2019-
Scope of work:	Development of a process for the production of high-alumina cement by means of a melting process in which salt slag (by-product of secondary aluminium production) and quicklime are used; Process engineering conception of the entire system and preparation support of permit application

Plant for combined biochar, heat and electricity production from solid biomass, Horn (Lower Austria, Austria)

Customer:	Biogas Waldviertel EV G.m.b.H., AT
Project period:	2018-2019
Technical specifications:	Biochar production: 580 kg / h; Nominal thermal output: 2.2 MW; Nominal electrical power: 500 kW ORC process
Scope of work:	Technical concept of the entire system, submission of national funding, energetic optimization of the entire system, preparation of permit applications

Integration of a heat pump into the biomass district heating plant Lienz (Tyrol, Austria)

Customer:	Stadtwärme Lienz Produktions- und Vertriebs-GmbH, AT
Project period:	2018-2020
Technical specifications:	Nominal thermal capacity: compression heat pump 1.77 MW; flue gas condenser 1.45 MW
Scope of work:	Preliminary design of the overall plant; preparation of funding application, preparation of permit applications, detailed design, supervision of construction, support of commissioning and acceptance of the plant

BIOREG - "Absorbing the Potential of Wood Waste in EU Regions and Industrial Bio-based Ecosystems"

Funding authority:	European Commission (Horizon 2020; Project No. 727958)
Project period:	2017-2020
Scope of work:	The objective of BioReg project was to identify, develop and fully unlock the unused wood waste potential at European level and allow for the implementation of the full range of wood waste valorisation practices among European regions. The project facilitates the identification and selection of best practices and success factors among European demonstrator regions which should be transferred to regions with unused wood waste potential

Optimisation heat recovery from the lime plant Leube and integration of a heat storage tank, Golling (Salzburg, Austria)

Customer:	Salzburg AG, AT
Project period:	2016-2018
Technical specifications:	Nominal thermal capacity: Heat recovery of exhaust gases 2 x 1 MW, 30 m^3 heat storage tank
Scope of work:	Optimisation concept, detailed design, supervision of construction, support of commissioning and acceptance of the plant

Energetic utilisation of Sargassum seaweed

Customer:	Gesellschaft für internationale Zusammenarbeit (GIZ), DE
Project period:	2015
Scope of work:	Pre-feasibility study regarding the energetic utilisation of Sargassum seaweed from the Caribbean Sea based on hydrothermal carbonisation (HTC) and pyrolysis

Heat recovery from wood industry Pfeifer used for district heating of Wörgl (Tyrol, Austria)

Customer:	Stadtwerke Wörgl GmbH, AT
Project period:	2015
Scope of work:	Preliminary design (comparison of alternatives)

PITAGORAS - "Sustainable urban Planning with Innovative and low energy Thermal And power Generation from Residual And renewable Sources"

Funding authority:	European Commission (Framework Programme 7, Project No. 314596)
Project period:	2013-2018
Technical specifications:	Heat recovery of exhaust gases in a steel foundry: 10 MW (saturated steam) Nominal electric capacity: 2.0 MW ORC process
Scope of work:	Energetic and economic optimisation of the overall plant; support of commissioning, acceptance and monitoring of the plant

Heat recovery from various waste heat sources of Tirol Milch Wörgl used for district heating of Wörgl (Tyrol, Austria)

Customer:	Stadtwerke Wörgl GmbH, AT
Project period:	2013-2018
Technical specifications:	Nominal thermal capacity: compression heat pumps 2 x 1.5 MW, 1 x 1.1 MW; flue gas condensation unit 1.0 MW condenser and 0.35 MW ECO; heat recovery from the ice water cooling device 3.2 MW; 2 x 8.0 MW gas-fired boiler
Scope of work:	Preliminary design of the overall plant; preparation of funding application, preparation of permit applications, detailed design, supervision of construction, support of commissioning and acceptance of the energy centre

Development of highly efficient heating systems with small-scale biomass combustion systems (SmartResidentialHeat)

Funding authority:	Klima- und Energiefonds, AT (funding) and Austrian Research Promotion Agency (FFG), AT (funding program management)
Project period:	2013-2015
Scope of work:	Simulation of the annual operation of small-scale biomass combustion systems using TRNSYS (software for the simulation HVAC installations in buildings) to identify factors influencing the annual utilisation rate as well as to evaluate and select optimisation measures. Performance of stationary and transient CFD-based simulations to optimise furnace and boiler. Performance of test runs with comprehensive measurements and analyses at the in-house test stand in order to verify the optimisation measures selected based on the results of the simulations. Preparation of guidelines regarding the possibilities to increase the annual utilisation rate of small-scale biomass combustion systems

Heat recovery concept of the first extension stage of existing district heating plant Wörgl (Tyrol, Austria)	
Customer:	Stadtwerke Wörgl GmbH, AT
Project period:	2012
Scope of work:	Development of a basic concept with gas turbine, different waste heat sources and gas boilers to cover peak loads and determine appropriate mass and energy balances and heat production costs of the energy centre
Heat exchanger development for improved fine dust separation and flue gas condensation	
Funding authority:	Austrian Research Promotion Agency (FFG), AT
Project period:	2012
Technical specifications:	Nominal fuel capacity: 0.3 - 10 MW
Scope of work:	Conception of a new boiler technology based on quenching of hot gas and condenser; fuel: wood chips
Heat recovery of industrial flue gas streams of a steel works, Kindberg (Styria, Austria)	
Customer:	voestalpine Tubulars GmbH & Co KG, AT
Project period:	2011-2012
Scope of work:	Technical design of the plant concept of the overall plant within the program "New Energy 2020" of the Austrian climate and energy fund; Project title: "Storage-supported power generation from discontinuous waste heat streams with an ORC-plant at voestalpine Tubulars GmbH & Co KG"
Optimisation of the utilisation from biomass systems and combined biomass-solar-heating systems for small-scale, medium and large-scale plants	
Funding authority:	Austrian Research Promotion Agency (FFG), AT
Project period:	2011
Scope of work:	Long-term monitoring and data collection for selected biomass systems and combined biomass-solar-heating systems, system engineering and weak point analyses of the selected biomass and combined biomass-solar-heating systems based on the collected monitoring data, development of the basic concept of a model based regulation of small plant systems, development of standardised methods for an optimised control and plant concept of medium and large-scale biomass-heating-systems
Biomass flue gas condensation in combination with heat pumps	
Funding authority:	Austrian Research Promotion Agency (FFG), AT
Project period:	2011
Scope of work:	Conception of energetically, economically and ecologically optimised biomass flue gas condensation units within the program "Neue Energien 2020" of the Austrian Energy and Climate Fund; Project name: "Innovative flue gas condensation with a high annual utilization rate by combination with heat pumps"
Energy concept for the shopping centre Buzin (Zagreb, Croatia)	
Customer:	M2 Baumanagement GmbH, HR
Project period:	2009
Technical specifications:	Nominal thermal capacity: gas engines 9 MW, ORC unit 2.4 MW; nominal electrical capacity: gas engines 13.4 MW, ORC unit: 0.48 MW; nominal chilling capacity: 15 MW; recooling with open and closed cooling towers, nominal cooling capacity: 34.2 MW; heat supply for the absorptions chillers by hot water
Scope of work:	Preliminary design and plant conception - Overall energy concept for the heating, cooling and power supply based on gas engine CHP plants and absorption and compression chillers

Heat recovery of industrial flue gas streams of a cement plant, Waldegg (Lower Austria, Austria)	
Customer:	Wopfinger Baustoffindustrie GmbH, AT
Project period:	2009-2010
Scope of work:	Preliminary design of the overall plant within the program "New Energy 2020" of the Austrian climate and energy fund; Project title: "Innovative low temperature and waste heat utilisation in the cement manufacturing process using absorption pump technology"
Steam generation with waste heat from an existing biogas plant with gas engine, Holsworthy (Devon, United Kingdom)	
Customer:	Summerleaze Ltd., UK
Project period:	2009
Scope of work:	Preliminary design
Heat and power production by waste heat recovery of industrial waste heat based on an ORC cycle, Secunda (Mpumalanga, South Africa)	
Customer:	HRS - Heat Recovery Solutions Ltd., ZA
Project period:	2009
Scope of work:	Preliminary design
Heat recovery of industrial flue gas streams of a cement plant based on an ORC cycle, Wietersdorf (Carinthia, Austria)	
Customer:	Wietersdorfer&Peggauer Zementwerke GmbH, AT
Project period:	2008-2009
Scope of work:	Preliminary design of the overall plant within the program "New Energy 2020" of the Austrian climate and energy fund; Project title: "Waste heat utilisation: Utilisation possibilities of industrial waste heat for the production of hot water and power supply for industrial and municipal purposes"
Interconnection of biomass drying plants with biomass CHP and heating plants	
Customer:	Andritz AG, AT
Project period:	2007
Scope of work:	Technical and economic evaluation of the interconnection of different biomass drying technologies with biomass CHP and heating plants
Heat and power production by waste heat recovery of industrial flue gas streams based on an ORC cycle – RHI AG, Radenthein (Carinthia, Austria)	
Customer:	RHI AG, AT
Project period:	2007-2009
Technical specifications:	Nominal thermal capacity: 5.8 MW flue gas / thermal oil heat exchanger; nominal electric capacity: 1.0 MW ORC process
Scope of work:	Preliminary design of the overall plant, preparation of funding application, energetic and economic optimisation of the overall plant, preparation of permit applications, detailed design and supervision of construction and commissioning of the overall plant

Heat recovery from an existing CHP-plant, Domat (Grisons, Switzerland)

Customer:	Holzindustrie Stallinger, CH
Project period:	2006-2007
Technical specifications:	District heating capacity: approx. 14.5 MWth; length of pipe network: approx. 2,200 m
Scope of work:	Detailed design and supervision of construction and commissioning of the heating network

SUPOSS – Sustainable Power Supply for Supermarkets and Surroundings

Funding authority:	Austrian Research Promotion Agency (FFG), AT
Project period:	2004
Scope of work:	Development of technical and commercial concepts and strategies for a sustainable energy supply of super markets and neighbouring consumers (industry and trade, households) with heat, electricity and cooling based on the energy sources solar and biomass - SUPOSS (Sustainable Power Supply for Supermarkets and Surroundings) Project within the programme “Energiesysteme der Zukunft“; project coordinator: IMG Innovation-Management-Group GmbH, Grambach

Waste heat recovery by flue gas condensation / Holzindustrie KAINDL (Salzburg, Austria)

Customer:	M. Kaindl Holzindustrie, AT
Project period:	1997-2000
Technical specifications:	District heating capacity: approx. 16.0 MWth; length of pipe network: 14,000 m
Scope of work:	Energy master plan, feasibility study, emission forecast, environmental and technological assessment, detailed calculation of the flue gas condensation unit, preparation of the proposal for funding under the EU-THERMIE programme

Waste heat recovery for district heat utilisation and design of pipe network / BIOCHEMIE Kundl GmbH (Tyrol, Austria)

Customer:	Biochemie GmbH, AT
Project period:	1995-1997
Technical specifications:	District heating capacity: 13.0 MWth; length of pipe network: 17,000 m
Scope of work:	Energy master plan, feasibility study, emission forecast, technological assessment, detailed design of the waste heat recovery process and of the district heating network, supervision of construction

District heating plants and process heat supply

Grid calculation and grid analysis of the district heating grid in St. Johann (Tyrol, Austria)

Customer:	Ortswärme St. Johann in Tirol GmbH, AT
Project period:	2007-2021
Scope of work:	Grid calculation for a district heating grid with several feed-in points and loop connections

Expansion concept - biomass district heating plant Wörgl (Tyrol, Austria)

Customer:	Stadtwerke Wörgl GmbH, AT
Project period:	2020
Scope of work:	Assessment of various expansion options

Expansion concept - Biomass district heating plant Lienz (Tyrol, Austria)

Customer:	Stadtwärme Lienz Produktions- und Vertriebs-GmbH, AT
Project period:	2020
Scope of work:	Assessment of various expansion options and future scenarios

Heat supply location Imst industrial zone - Holzindustrie Pfeifer (Tyrol, Austria)	
Customer:	Pfeifer Holz GmbH & Co KG, AT
Project period:	2020
Technical specifications:	Nominal thermal capacity: 1.25 MW hot water boiler, 1.50 MW thermal oil boiler
Scope of work:	Heat supply concept, preparation of permit applications, detailed design, preparation of bids, supervision of construction, support of commissioning and acceptance of the plant
Biomass boiler and heat recovery with flue gas condensation unit, Frankenmark (Upper Austria, Austria)	
Customer:	Holzindustrie Stallinger GmbH, AT
Project period:	2020
Technical specifications:	Nominal thermal capacity hot water boiler: 9.9 MW
Scope of work:	Heat supply concept, preparation of permit applications, detailed design, preparation of bids, supervision of construction, support of commissioning and acceptance of the plant
Renewal of boiler systems - biomass district heating plant in Sulzberg - National demonstration project (Vorarlberg, Austria)	
Customer:	Bäuerliche Genossenschaft Biomasse Fernwärme Sulzberg, AT
Project period:	2019-2020
Technical specifications:	Nominal thermal capacity: 0.60 MW biomass hot water boiler, 0.45 MW biomass hot water boiler with new innovative combined gasification and combustion technology
Scope of work:	Technical concept, preparation of permit applications, preparation of permit applications, detailed design, preparation of bids, supervision of construction, support of commissioning and acceptance of the plant
Decentralised district heating plant Kufstein (Tirol, Österreich)	
Customer:	Bioenergie Kufstein GmbH, AT
Project period:	2019
Technical specifications:	Nominal thermal capacity: 13.6 MW hot water boiler
Scope of work:	Technical concept
Biomass heating plant Wiehag, Altheim (Oberösterreich, Österreich)	
Customer:	Wiehag GmbH, AT
Project period:	2018-2019
Technical specifications:	Nominal thermal capacity: 3 MW biomass hot water boiler, 4 MW natural gas hot water boiler
Scope of work:	Technical concept, preparation of permit applications, preparation of permit applications, detailed design, preparation of bids, supervision of construction, support of commissioning and acceptance of the plant
Installation of a natural gas genset and a natural gas boiler, Chanovice (Czech Republic)	
Customer:	Pfeifer Holz s.r.o., CZ
Project period:	2018-2020
Technical specifications:	Nominal thermal capacity: 10 MW natural gas boiler, 3.3 MW genset; Nominal electric capacity: 3.4 MW genset
Scope of work:	Preparation of permit applications, detailed design, supervision of construction and support of commissioning and acceptance of the plant
Implementation of a heat storage tank and heat distribution centre, Frankenmarkt (Upper Austria, Austria)	
Customer:	Holzindustrie Stallinger GmbH, AT
Project period:	2017-2019
Technical specifications:	Heat storage 2 x 150 m³
Scope of work:	Preparation of permit applications, detailed design, preparation of bids, supervision of construction, support of commissioning and acceptance of the plant

Biomass district heating plant Weiz – extension Fernwärme Weiz (Styria, Austria)	
Customer:	Fernwärme Weiz GmbH, AT
Project period:	2017-2018
Technical specifications:	Nominal thermal capacity: 8.0 MW biomass hot water boiler
Scope of work:	Preliminary design of the overall plant; preparation of funding application, preparation of permit applications, detailed design, supervision of construction, support of commissioning and acceptance of the overall plant
Waste wood combustion plant at the existing biomass CHP plant, Lienz (Tyrol, Austria)	
Customer:	Stadtwärme Lienz Produktions- und Vertriebs-GmbH, AT
Project period:	2017
Scope of work:	Preliminary design
Biomass boiler and heat recovery with flue gas condensation unit, Frankenmarkt (Upper Austria, Austria)	
Customer:	Holzindustrie Stallinger GmbH, AT
Project period:	2016
Scope of work:	Preliminary design
District heating grid in St. Johann (Tyrol, Austria)	
Customer:	Ortswärme St. Johann in Tirol GmbH, AT
Project period:	2016
Scope of work:	Technical concept pump station
Optimisation of biomass district heating plant Irdning (Styria, Austria)	
Customer:	Bäuerliche Biowärmelieferungsgenossenschaft Irdning reg. Gen.m.b.H., AT
Project period:	2015-2018
Technical specifications:	Nominal thermal capacity: 4.2 MW biomass pressurised hot water boiler
Scope of work:	Integration of a new 600 kW pressurised hot water economiser and optimisation of the furnace with CFD modelling. Detailed design, preparation of bids, supervision of construction, support of commissioning and acceptance of the plant
Implementation of a heat storage tank in the Biomass district heating plant, St. Walburg im Ultental (South Tyrol, Italy)	
Customer:	Förderungsgenossenschaft Ulten, IT
Project period:	2014-2015
Technical specifications:	Heat storage tank 120 m³
Scope of work:	Detailed design, preparation of bids, supervision of construction, support of commissioning and acceptance of the plant
Reconstruction of the biomass boiler, Aschbach (Lower Austria, Austria)	
Customer:	EVN Wärme GmbH, AT
Project period:	2014-2016
Technical specifications:	Nominal thermal capacity: 5.0 MW biomass steam boiler; 8.0 MW gas fired boiler
Scope of work:	Detailed design, preparation of bids, supervision of construction, support of commissioning and acceptance of the plant
Replacement heating system Borne plant 1, Trierweiler (Rhineland-Palatinate, Germany)	
Customer:	Klaus Borne Türenfabrik GmbH & Co KG, DE
Project period:	2014-2015
Technical specifications:	Nominal thermal capacity: 800 kW biomass hot water boiler + 50 kW Eco; 300 kW oil fired boiler
Scope of work:	Detailed design, preparation of bids, supervision of construction, support of commissioning and acceptance of the plant

Grid calculation and grid analysis of the district heating grid in St. Johann (Tyrol, Austria)	
Customer:	Ortswärme St. Johann in Tirol GmbH, AT
Project period:	2013
Scope of work:	Grid calculations for a district heating grid with 30.5 MW connection capacity with 3 feed-in points and loop connections
Reconstruction of the biomass boiler and construction of a gas fired boiler, Waidhofen/Ybbs (Lower Austria, Austria)	
Customer:	EVN Wärme GmbH, AT
Project period:	2013-2014
Technical specifications:	Nominal thermal capacity: 5.0 MW biomass hot water boiler; 8.0 MW gas fired boiler
Scope of work:	Detailed design, preparation of bids, supervision of construction, support of commissioning and acceptance of the plant
Biomass district heating plant Guntramsdorf (Lower Austria, Austria)	
Customer:	EVN Wärme GmbH, AT
Project period:	2013
Technical specifications:	Nominal thermal capacity: 8.2 MW biomass boiler; 9.0 MW gas fired boiler
Scope of work:	Preparation of permit applications of the overall plant
Reconstruction CHP plant Lienz 1 and design of a decentralised heating plant for peak load coverage and stand-by unit, Lienz (Tyrol, Austria)	
Customer:	Stadtwärme Lienz Produktions- und Vertriebs-GmbH, AT
Project period:	2012-2014
Technical specifications:	Nominal thermal capacity: 8.0 MW biomass steam boiler, 2 x 11.0 MW oil fired boiler
Scope of work:	Preliminary design of the overall plant; preparation of funding application, preparation of permit applications, detailed design, supervision of construction, support of commissioning and acceptance of the overall plant
District heat supply Dölsach (Tyrol, Austria)	
Customer:	Architektengemeinschaft DI E. Griessmann - DI B. Scherzer - DI W. Mayr, AT
Project period:	2012
Scope of work:	Preparation of funding application
Optimised utilisation of the district heating network and efficiency improvement by the use of decentralised heat storage - Local Heat Store, Lienz (Tyrol, Austria)	
Customer:	Stadtwärme Lienz Produktions- und Vertriebs-GmbH, AT
Project period:	2011-2012
Technical specifications:	District heating capacity: approx. 50 MWth
Scope of work:	To enable the connection of new customers and to increase the efficiency of the heat supply system, local heat storage solutions as well as an optimisation of the secondary heat supply systems at the customers were implemented using an integrated approach. Development of tools for monitoring and evaluation of the heat customers. Development of local heat storage solutions. Implementation, monitoring and evaluation of the measures

Process heat supply based on a biomass saturated steam boiler plant – Wibeba Holz GmbH, Wieselburg (Lower Austria, Austria)

Customer:	WIBEBA-Holz Ges.m.b.H, AT
Project period:	2011-2013
Technical specifications:	Nominal thermal capacity: 2.1 MW biomass saturated steam boiler
Scope of work:	Preliminary design of the overall CHP plant, preparation of applications for national funding, preparation of permit applications, detailed design, supervision of construction and support of commissioning and acceptance of the overall CHP plant

Process heat supply based on a biomass steam boiler plant - austriamicrosystems AG, Unterpremstätten (Styria, Austria)

Customer:	austriamicrosystems AG, AT
Project period:	2011-2012
Technical specifications:	Nominal thermal capacity: 3.5 MW biomass steam boiler
Scope of work:	Preliminary design of the overall plant; preparation of funding application, preparation of permit applications of the overall plant

Process heat supply based on a biomass hot water boiler plant – Holzindustrie Lenzing (Upper Austria, Austria)

Customer:	Holzindustrie Lenzing GmbH, AT
Project period:	2010-2011
Technical specifications:	Nominal thermal capacity: 3.0 MW biomass pressurised hot water boiler + 0.1 MW pressurised hot water economiser
Scope of work:	Preliminary design of the overall plant; preparation of funding application, preparation of permit applications, detailed design, supervision of construction, support of commissioning and acceptance of the overall plant

Biomass district heating plant Lienz – extension Stadtwärme Lienz (Tyrol, Austria)

Customer:	Stadtwärme Lienz Produktions- und Vertriebs-GmbH, AT
Project period:	2009
Technical specifications:	Nominal thermal capacity: 5.0 MW biomass pressurised hot water boiler + 0.4 MW pressurised hot water economiser
Scope of work:	Preliminary design of the overall plant; preparation of funding application and preparation of permit applications

Biomass district heating plant Weiz – extension Fernwärme Weiz (Styria, Austria)

Customer:	Fernwärme Weiz GmbH, AT
Project period:	2009-2010
Technical specifications:	Nominal thermal capacity: 6.0 MW biomass pressurised hot water boiler
Scope of work:	Preliminary design of the overall plant; preparation of funding application, preparation of permit applications, detailed design, supervision of construction, support of commissioning and acceptance of the overall plant

Biomass district heating plant, Werfenweng (Salzburg, Austria)

Customer:	Gemeinde Werfenweng, AT
Project period:	2008
Scope of work:	Preliminary design

Utilisation of discharged air from the production of abrasive materials as combustion air for a biomass thermal oil boiler for the process heat supply and for the heating of a thermal-catalytic post-combustion Bad St. Leonhard (Carinthia, Austria)

Customer:	HERMES Schleifmittel GmbH, AT
Project period:	2008
Scope of work:	Preliminary design

Process heat supply Holzindustrie Lenzing (Upper Austria, Austria)	
Customer:	Holzindustrie Lenzing GmbH, AT
Project period:	2008-2009
Technical specifications:	Length of pipe network: ca. 220 m
Scope of work:	Preparation of funding application, detailed design, supervision of construction, support of commissioning and acceptance of the overall plant - implementation of the biomass boiler including the backfitting of the hydronic installations
Heat extraction/process heat supply, plant enlargement / Tilly Holzindustrie, Althofen (Carinthia, Austria)	
Customer:	Tilly Holzindustrie Gesellschaft m.b.H., AT
Project period:	2008
Technical specifications:	Nominal thermal capacity: 4.0 MW oil heated hot water boiler
Scope of work:	Preliminary design of the overall plant; preparation of funding application, preparation of permit applications, detailed design, supervision of construction, support of commissioning and acceptance of the overall plant - process heat extraction and implementation of the oil boiler in the overall heating system
Process heat supply for a pellets production plant based on a biomass hot water boiler / Petrozavodsk (Karelia, Russia)	
Customer:	Borodino Company, RU
Project period:	2007
Scope of work:	Preliminary design
Biomass based district heating and process heat supply, Sursee (Lucerne, Switzerland)	
Customer:	Holinger AG, CH
Project period:	2007
Scope of work:	Preliminary design
Process steam supply based on a biomass steam boiler plant, Lagerhaus Klagenfurt (Carinthia, Austria)	
Customer:	Unser Lagerhaus Warenhandelsgesellschaft m.b.H., AT
Project period:	2007
Scope of work:	Preliminary design
Biomass district heating plant, St. Pankraz (South Tyrol, Italy)	
Customer:	Förderungsgenossenschaft Ulten, IT
Project period:	2007
Scope of work:	Plant extension
Biomass district heating plant, Sulzberg-Thal (Vorarlberg, Austria)	
Customer:	Gemeinde Sulzberg, AT
Project period:	2007
Scope of work:	Preliminary design
Biomass district heating plant, Stange (South Tyrol, Italy)	
Customer:	Saturn GmbH, IT
Project period:	2007
Scope of work:	Preliminary design
Process steam supply based on a biomass steam boiler plant / Tirol Milch Wörgl (Tyrol, Austria)	
Customer:	Tirol Milch reg.Gen.m.b.H., AT
Project period:	2006-2007
Technical specifications:	Nominal fuel capacity: 7.2 MW ; steam capacity: 9.2 t/h
Scope of work:	Preliminary design of the overall plant; preparation of funding application, preparation of permit applications, detailed design, supervision of construction, support of commissioning and acceptance of the overall plant

Biomass district heating plant, Zams (Tyrol, Austria)	
Customer:	Lenhart der Tischler GmbH, AT
Project period:	2006
Scope of work:	Preliminary design
Biomass heating plant / Holzindustrie Kaindl (Salzburg, Austria)	
Customer:	M. Kaindl Holzindustrie, AT
Project period:	2006
Scope of work:	Preliminary design
Biomass district heating plant, Friesach (Carinthia, Austria)	
Customer:	Springer Maschinenfabrik AG, AT
Project period:	2006
Scope of work:	Optimisation of the plant and extension of the district heating system
Biomass district heating plant, Proveis (South Tyrol, Italy)	
Customer:	Gemeinde Proveis, IT
Project period:	2006
Scope of work:	Preliminary design
District heat supply Weiz (Styria, Austria)	
Customer:	Fernwärme Weiz GmbH, AT
Project period:	2004
Scope of work:	Dimensioning of the pipe network
Biomass district heating plant in Santa Fe (New Mexico, USA)	
Customer:	Local Energy, US
Project period:	2003-2006
Scope of work:	Preliminary design and preparation of bids
Biomass district heating plant, Lajen (South Tyrol, Italy)	
Customer:	Gemeinde Lajen, IT
Project period:	2003-2004
Technical specifications:	Nominal thermal capacity: 1.4 MW biomass pressurised hot water boiler + 0.1 MW pressurised hot water economiser; length of pipe network: approx. 5,500 m
Scope of work:	Preliminary design of the overall plant; preparation of funding application, technical and economic optimisation of the district heating network and the biomass heating plant, preparation of permit applications, detailed design, supervision of construction and commissioning of the district heating network and the biomass heating plant, project performed in cooperation with Ingenieurteam Bergmeister GmbH, South Tyrol
Biomass district heating plant, Oberlech (Vorarlberg, Austria)	
Customer:	Burg-Hotel Oberlech, AT
Project period:	2002-2003
Technical specifications:	Nominal thermal capacity: 0.35 MW biomass pressurised hot water boiler; length of network: approx. 1,000 m
Scope of work:	Preliminary design of the overall plant; preparation of applications for funding; technical and economic optimisation of the district heating network and plant, preparation of permit applications; detailed design of the district heating network and biomass combustion plant, supervision of construction, support of commissioning and acceptance of the overall plant
Biomass district heating plant, Latzfons and Verdings (South Tyrol, Italy)	
Customer:	SEL AG, IT
Project period:	2002
Scope of work:	Preliminary design

Biomass district heating plant, St. Nikolaus in the Ulten Valley (South Tyrol, Italy)	
Customer:	Förderungsgenossenschaft Ulten, IT
Project period:	2002-2004
Technical specifications:	Nominal thermal capacity: 0.6 MW biomass pressurised hot water boiler + 0.06 MW pressurised hot water economiser; length of pipe network: approx. 2,200 m
Scope of work:	Preliminary design of the overall plant; preparation of funding application, preparation of permit applications, detailed design, supervision of construction, support of commissioning and acceptance of the overall plant
Biomass district heating plant, Haus im Ennstal (Styria, Austria)	
Customer:	Steirische Fernwärme GmbH, AT
Project period:	2001
Scope of work:	Preliminary design and preparation of plant application
District heat supply, Admont (Styria, Austria)	
Customer:	Steirische Fernwärme GmbH, AT
Project period:	2001
Scope of work:	Preliminary design
Biomass district heating plant / Sawmill Gruber, Morter (South Tyrol, Italy)	
Customer:	Konrad Gruber OHG, IT
Project period:	2001
Scope of work:	Preliminary design
Biomass district heating plant / Unsere Liebe Frau im Walde (South Tyrol, Italy)	
Customer:	Gemeinde Unsere Liebe Frau im Walde, IT
Project period:	2001
Scope of work:	Preliminary design
Biomass district heating plant, Sulzberg (Vorarlberg, Austria)	
Customer:	Bäuerliche Genossenschaft Biomasse Fernwärme Sulzberg, AT
Project period:	2001-2002 and 2006-2007
Technical specifications:	Nominal thermal capacity: 0.6 MW biomass pressurised hot water boiler + 0.4 MW biomass pressurised hot water boiler + 0.1 MW pressurised hot water economiser; length of pipe network: approx. 4,800 m
Scope of work:	Preliminary design of the overall plant; preparation of funding application, preparation of permit applications, detailed design, supervision of construction, support of commissioning and acceptance of the overall plant
Biomass district heating plant, Lech am Arlberg (Vorarlberg, Austria)	
Customer:	Vorarlberger Kraftwerke AG, AT
Project period:	1998-1999
Technical specifications:	Nominal thermal capacities: 5.0 MW + 2.5 MW biomass pressurised hot water boiler + 1.5 MW flue gas condensation unit; length of pipe network: approx. 15,000 m
Scope of work:	Preliminary design of the overall plant; detailed design and supervision of construction of the biomass furnace and boiler, flue gas cleaning system and the flue gas condensation unit

Biomass district heating plant, St. Walburg im Ultental (South Tyrol, Italy)

Customer:	Förderungsgenossenschaft Ulten, IT
Project period:	1998-2000
Technical specifications:	Nominal thermal capacity: 1.4 MW biomass pressurised hot water boiler + 0.12 MW pressurised hot water economiser; length of pipe network: approx. 10,300 m
Scope of work:	Preliminary design of the overall plant; preparation of funding application, technical and economic optimisation of the district heating network and plant, preparation of permit applications, detailed design, supervision of construction of the overall plant including the network of pipes; support of commissioning and acceptance, plant monitoring and process optimisation

Biomass district heating plant, St. Pankraz im Ultental (South Tyrol, Italy)

Customer:	Förderungsgenossenschaft Ulten, IT
Project period:	1998-2000 and 2007
Technical specifications:	Nominal thermal capacity: 0.6 MW biomass pressurised hot water boiler + 0.06 MW pressurised hot water economiser; length of pipe network: approx. 1,500 m
Scope of work:	Preliminary design of the overall plant; preparation of funding application, technical and economic optimisation of the district heating network and plant, preparation of permit applications, detailed design, supervision of construction of the overall plant including the network of pipes; support of commissioning and acceptance, plant monitoring and process optimisation

Biomass district heating plant, Tamsweg - EU-THERMIE demonstration project (Salzburg, Austria)

Customer:	Fernwärmeversorgungs GmbH, AT
Project period:	1995-1996
Technical specifications:	Nominal thermal capacities: 5.0 MW + 3.0 MW biomass pressurised hot water boiler + 1.6 MW flue gas condensation; length of pipe network: 22,000 m
Scope of work:	Preliminary design and detailed design of the innovative plant components: biomass drying unit, newly designed biomass furnace with integrated fractionated heavy metal separation and NOx reduction by primary measures, improved and computer-aided plant control and monitoring system, flue gas condensation unit with integrated sludge/condensate separation; monitoring and process optimisation including flue gas measurements and ash analyses over a two-year period, documentation of the whole project

Biomass combined heat and power plants based on an ORC cycle

Biomass CHP plant based on an ORC cycle, Leoben (Styria, Austria)

Customer:	Mayr-Melnhof Biomassekraftwerk Leoben GmbH, AT
Project period:	2016
Scope of work:	Preparation of permit applications for the installation of an ORC process and a flue gas condensation unit

Biomass CHP plant based on an ORC cycle, Salzburg (Austria)

Customer:	SEEGEN, AT
Project period:	2016
Scope of work:	Technical and economic optimisation of several plants in order to extend the duration for the feed-in tariffs

Flexible operation concepts of biomass CHP plants based on solid biomass in district heating networks	
Funding authority:	Klima- und Energiefonds, AT (funding) and Austrian Research Promotion Agency (FFG), AT (funding program management)
Project period:	2016-2018
Scope of work:	Research project for more flexible operation concepts of biomass CHP plants based on solid biomass in district heating networks. Investigation of suitable process engineering & control design concepts to improve load change dynamics and partial load behaviour of biomass-fired CHP's and to development of optimal system constellations
Concentrated solar power combined with biomass CHP using ORC-technology, Bronderslev (Denmark)	
Customer:	PlanEnergi, DK
Project period:	2016
Technical specifications:	Nominal thermal capacity: 2x10 MW biomass thermal oil boiler; concentrated solar plant (CSP) 16,6 MW ; nominal electric capacity: 3,9 MW ORC-process
Scope of work:	Support of conception and commissioning of the overall plant
Biomass CHP plant based on an ORC cycle, Hanover (New Hampshire, USA)	
Customer:	Dartmouth College, USA
Project period:	2016
Scope of work:	Preliminary design
Biomass CHP plant based on an ORC cycle, Steinfort (Luxemburg)	
Customer:	Cycleenergy Biomass Power AG, AT
Project period:	2014
Scope of work:	Technical and economic evaluation of the project
Biomass CHP plant based on an ORC cycle, Plumas (Californien, USA)	
Customer:	Wisewood Inc., USA
Project period:	2014
Technical specifications:	Nominal thermal capacity: 15 MW biomass thermal oil boiler; nominal electric capacity: 3,9 MW ORC-process
Scope of work:	Preliminary technical design of the overall CHP plant
Biomass CHP plant based on an ORC cycle, Karyes (Mount Athos, Greece)	
Customer:	Holy and Great Monastery of Vatopaidi, GR
Project period:	2012-2015 and 2017-2018
Technical specifications:	Nominal thermal capacity: 1.6 MW biomass thermal oil boiler + 0.3 MW thermal oil economiser; nominal electric capacity: 300 kW ORC process; nominal chilling capacity: 1 MW
Scope of work:	Preliminary design of the overall CHP plant, preparation of permit applications, detailed design of the overall CHP plant
Biomass CHP plant based on an ORC cycle, Trierweiler (Rheinland-Pfalz, Germany)	
Customer:	Klaus Borne Türenfabrik GmbH & Co KG, DE
Project period:	2012
Technical specifications:	Nominal thermal capacity: 4.8 MW biomass thermal oil boiler + 1.1 MW thermal oil economiser; nominal electric capacity: 1,0 MW ORC process
Scope of work:	Preliminary design of the overall CHP plant
Biomass CHP plant based on an ORC cycle, Kuressaare (Saare, Estonia)	
Customer:	AS Kuressaare Soojus, EE
Project period:	2010-2013
Technical specifications:	Nominal thermal capacity: 9.8 MW biomass thermal oil boiler + 2.2 MW thermal oil economiser; nominal electric capacity: 2.2 MW ORC process
Scope of work:	Detailed design, supervision of construction and support of commissioning and acceptance of the overall CHP plant, plant monitoring and process optimisation

Next generation CHP plant with an ORC plant based on a hybrid system consisting of biomass combustion and solar energy - EU demonstration project "Sunstore 4", Marstal (AERO, Denmark)

Customer:	Marstal Fjernvarme a.m.b.a., DK
Project period:	2010-2013
Technical specifications:	Nominal thermal capacity: 3,24 MW biomass thermal oil boiler + 0,91 MW thermal oil economiser; nominal electric capacity: 750 kW ORC-Process
Scope of work:	detailed design of the biomass CHP plant; CFD-simulation of the biomass furnace and the thermal oil boiler, supervision of construction and support of commissioning and acceptance of the biomass CHP plant

Biomass CHP plant based on an ORC cycle, Unterpremstätten (Styria, Austria)

Customer:	austriamicrosystems AG, AT
Project period:	2010
Scope of work:	Preliminary design

Biomass CHP plant based on an ORC cycle, Rajghat (Daragaon, Bangladesh)

Customer:	Solor Bioenergi Holding AS, NO
Project period:	2009
Scope of work:	Preliminary design

Biomass CHP plant based on an ORC cycle, Mühlbach (South Tyrol, Italy)

Customer:	Konrad Lanz GmbH, IT
Project period:	2009
Scope of work:	Preliminary design

Biomass CHP plant based on an ORC cycle, Lanouee Forest (Brittany, France)

Customer:	EFR Managemet LLP, FR
Project period:	2009
Scope of work:	Preliminary design

Biomass CHP plant based on an ORC cycle, Innsbruck (Tyrol, Austria)

Customer:	TIGAS-Erdgas Tirol GmbH, AT
Project period:	2008
Scope of work:	Preliminary design

Biomass CHP plant based on an ORC cycle, Übelbach (Styria, Austria)

Customer:	Gaulhofer Vertrieb GmbH & Co KG, AT
Project period:	2008
Scope of work:	Preliminary design

Biomass CHP plant based on an ORC cycle, Lenzing (Upper Austria, Austria)

Customer:	Holzindustrie Lenzing GmbH, AT
Project period:	2007
Scope of work:	Preliminary design

Biomass CHP plant based on an ORC cycle, Volketswil (Zurich, Switzerland)

Customer:	Holinger AG, CH
Project period:	2007
Scope of work:	Preliminary design

Biomass CHP plant based on an ORC cycle, Mariazell (Styria, Austria)

Customer:	Stadtbetriebe Mariazell Gesellschaft m.b.H., AT
Project period:	2007
Scope of work:	Preliminary design and preparation of permit applications

Biomass CHP plant based on an ORC cycle, Allendorf (Hessen, Germany)	
Customer:	Viessmann Werke GmbH & Co KG, DE
Project period:	2006-2008
Technical specifications:	Nominal thermal capacity: 1.1 MW biomass thermal oil boiler + 0.1 MW thermal oil economiser + 0.11 MW pressurised hot water economiser; nominal electric capacity: 0.18 MW ORC process
Scope of work:	Preliminary design of the overall CHP plant, preparation of permit applications, detailed design, supervision of construction and support of commissioning and acceptance of the overall CHP plant, plant monitoring and process optimisation
Biomass CHP plant based on an ORC cycle - enlargement of existing district heating plant, Olang (South Tyrol, Italy)	
Customer:	Fernheizwerk Olang GmbH, IT
Project period:	2006-2008
Technical specifications:	Nominal thermal capacity: 4.2 MW biomass thermal oil boiler + 0.15 MW pressurised hot water economiser; existing boiler: 2 x 4 MW biomass pressurised hot water boiler + 1.2 MW flue gas condensation unit; nominal electric capacity: 0.72 MW ORC process
Scope of work:	Preliminary design of the overall CHP plant, preparation of applications for national funding, preparation of permit applications, detailed design, supervision of construction and support of commissioning and acceptance of the overall CHP plant
Biomass CHP plant based on an ORC cycle / Josko Fenster und Türen GmbH, Kopfing (Upper Austria, Austria)	
Customer:	Josko Fenster und Türen GmbH, AT
Project period:	2006-2008
Technical specifications:	Nominal thermal capacity: 1.1 MW biomass thermal oil boiler + 0.1 MW thermal oil economiser + 0.15 MW pressurised hot water economiser; nominal electric capacity: 0.2 MW ORC process
Scope of work:	Preliminary design of the overall CHP plant, preparation of applications for national funding, preparation of permit applications, detailed design, supervision of construction and support of commissioning and acceptance of the overall CHP plant, plant monitoring and process optimisation
Biomass CHP plant based on an ORC cycle - enlargement of existing district heating plant, St.Walburg in the Ulten Valley (South Tyrol, Italy)	
Customer:	Förderungsgenossenschaft Ulten, IT
Project period:	2006-2007
Technical specifications:	Nominal thermal capacity: 1.2 MW thermal oil boiler incl. thermal oil economiser + 0.13 MW pressurised hot water economiser; nominal electric capacity: 0,2 MW ORC process
Scope of work:	Preliminary design of the overall plant; preparation of funding application, technical and economic optimisation of the plant, preparation of permit applications, detailed design, supervision of construction of the overall plant; support of commissioning and acceptance, plant monitoring and process optimisation
Biomass CHP plant based on an ORC cycle, Deutschlandsberg (Styria, Austria)	
Customer:	Koralm Energie GmbH, AT
Project period:	2005
Scope of work:	Preliminary design
Biomass CHP plant based on an ORC cycle (Mount Athos, Greece)	
Customer:	Holy and Great Monastery of Vatopaidi, GR
Project period:	2005
Scope of work:	Preliminary design and preparation of permit applications

Biomass CHP plant based on an ORC cycle, Ahrntal (South Tyrol, Italy)	
Customer:	Wärme- und Energiegenossenschaft Ahrntal, IT
Project period:	2005
Scope of work:	Preliminary design
Biomass CHP plant based on an ORC cycle, Northland Forest (Fort McMurray, AB, Kanada)	
Customer:	Northland Forest Products Ltd., CA
Project period:	2005
Scope of work:	Preliminary design
Biomass CHP plant based on an ORC cycle - enlargement of existing district heating plant, Tamsweg (Salzburg, Austria)	
Customer:	Fernwärmeversorgungs GmbH, AT
Project period:	2005-2006
Technical specifications:	Nominal electric capacity: 3.2 MW biomass thermal oil boiler + 0.5 MW pressurised hot water economiser; nominal electric capacity: 0.5 MW ORC process
Scope of work:	Preparation of applications for national funding, preparation of permit applications and detailed design of the overall CHP plant, supervision of construction, commissioning and acceptance of the CHP plant. Preparation of funding and permit applications in cooperation with SEEGEN, Salzburg
Biomass CHP plant based on an ORC cycle, Treibach/Althofen (Carinthia, Austria)	
Customer:	Tilly Holzindustrie Gesellschaft m.b.H., AT
Project period:	2004-2006
Technical specifications:	Nominal thermal capacity: 10 MW biomass thermal oil boiler + 1.5 MW pressurised hot water economiser; nominal electric capacity: 1.5 MW ORC process
Scope of work:	Preliminary design of the overall CHP plant, preparation of applications for national funding, preparation of permit applications, detailed design, supervision of construction and support of commissioning and acceptance of the overall CHP plant
Biomass CHP plant based on an ORC cycle, Frohnleiten (Styria, Austria)	
Customer:	Gemeindebetriebe Frohnleiten, AT
Project period:	2004
Scope of work:	Preliminary design and preparation of permit applications
Biomass CHP plant based on an ORC cycle, Horn, Vitis and Waidhofen (Lower Austria, Austria)	
Customer:	Fernwärmeversorgungsgenossenschaft Vitis, AT
Project period:	2004
Scope of work:	Preliminary design
Biomass CHP plant based on an ORC cycle, Sterzing (South Tyrol, Italy)	
Customer:	Fa. MAWERA Holzfeuerungsanlagen GesmbH, AT
Project period:	2003
Scope of work:	Preliminary design
Biomass CHP plant based on an ORC cycle / Weitzer Parkett, Weiz (Styria, Austria)	
Customer:	Weitzer-Parkett GmbH&CoKG, AT
Project period:	2003
Scope of work:	Preliminary design

Biomass CHP plant based on an ORC cycle, Längenfeld (Tyrol, Austria)	
Customer:	Tiroler Wasserkraft AG, AT
Project period:	2003-2004
Technical specifications:	Nominal thermal capacities: 4.0 MW biomass pressurised hot water boiler + 6.5 MW biomass thermal oil boiler + 1.2 MW flue gas condensation unit; nominal electric capacity: 1.1 MW ORC process
Scope of work:	Preliminary design of the overall plant, preparation of applications for national funding; technical and economic optimisation of the CHP unit, preparation of permit applications, detailed design and supervision of construction of the overall CHP plant, detailed design and support concerning the supervision of coordination of the district heating network
Biomass CHP plant based on an ORC cycle – extension Stadtwärme Lienz (Tyrol, Austria)	
Customer:	Stadtwärme Lienz Produktions- und Vertriebs-GmbH, AT
Project period:	2003-2006
Technical specifications:	Nominal thermal capacity: 8.7 MW biomass thermal oil boiler + 1.3 MW pressurised hot water economiser; nominal electric capacity: 1.5 MW ORC processes
Scope of work:	Preliminary design of the overall CHP plant, preparation of applications for national funding, preparation of permit applications, detailed design and supervision of construction of the CHP plant, support of commissioning and acceptance of the overall CHP plant; project performed in cooperation with PLAN.T, Graz
Biomass CHP plant based on an ORC cycle, Sexten (South Tyrol, Italy)	
Customer:	Fernheizwerk Sexten GmbH, IT
Project period:	2003
Scope of work:	Preliminary design
Biomass CHP plant based on an ORC cycle / Theurl sawmill, Assling (Tyrol, Austria)	
Customer:	Brüder Theurl GmbH Sägewerk und Hobelwerk, AT
Project period:	2003-2005
Technical specifications:	Nominal thermal capacity: 6.5 MW biomass thermal oil boiler + 0.5 MW pressurised hot water economiser; nominal electric capacity: 1.0 MW ORC process
Scope of work:	Preliminary design of the overall CHP plant, preparation of applications for national funding, preparation of permit applications, detailed design, supervision of construction and support of commissioning and acceptance of the overall CHP plant
Biomass CHP plant based on three ORC units / Biomasse-KWK-Leoben Betriebsgesellschaft m.b.H., Leoben (Styria, Austria)	
Customer:	Biomasse-KWK-Leoben Betriebsgesellschaft m.b.H., AT
Project period:	2003-2006
Technical specifications:	Total nominal thermal capacities: 26.1 MW biomass thermal oil boilers + 2.1 MW pressurised hot water economisers; total nominal electric capacity: 4.5 MW ORC processes
Scope of work:	Preparation of applications for national funding, preparation of permit applications, detailed design, support of supervision of construction, commissioning and acceptance of the overall CHP plant; project performed in cooperation with PLAN.T, Graz and EnerTec, Graz
Biomass CHP plant based on an ORC cycle / District heating plant Siezenheim (Salzburg, Austria)	
Customer:	FWG Fernwärme G.m.b.H., AT
Project period:	2002
Scope of work:	Preparation of permit applications in cooperation with Seegen

Biomass CHP plant based on an ORC cycle, Zams-Landeck (Tyrol, Austria)	
Customer:	Tiroler Wasserkraft AG, AT
Project period:	2002
Scope of work:	Preliminary design and preparation of permit applications
Biomass CHP plant based on an ORC cycle / Sarner Holz, Sarntein (South Tyrol, Italy)	
Customer:	Sarner Holz KG, IT
Project period:	2002
Scope of work:	Preliminary design
Extension of the existing biomass district heating plant in Lofer with a biomass CHP plant based on an ORC cycle, Lofer (Salzburg, Austria)	
Customer:	Hackschnitzel und Heizgenossenschaft Reg. Gen.m.b.H. Lofer – St. Martin, AT
Project period:	2002-2004
Technical specifications:	Nominal thermal capacity: 4.2 MW biomass thermal oil boiler (3.75 MW for the ORC process) + 0.6 MW pressurised hot water economiser; nominal electric capacity: 0.6 MW ORC process
Scope of work:	Preparation of applications for national funding; technical and economic optimisation of the CHP unit, preparation of permit applications, detailed design, supervision of construction and support of commissioning and acceptance of the overall CHP plant; project performed in cooperation with SEEGEN, Salzburg
Extension of the existing biomass district heating plant in Grossarl with a biomass CHP plant based on an ORC cycle, Großarl (Salzburg, Austria)	
Customer:	Hackschnitzel und Heizgenossenschaft Reg. Gen.m.b.H. Großarl, AT
Project period:	2002-2005
Technical specifications:	Nominal thermal capacity: 3.2 MW biomass thermal oil boiler + 0.5 MW pressurised hot water economiser; nominal electric capacity: 0.5 MW ORC process
Scope of work:	Preparation of applications for national funding; technical and economic optimisation of the CHP unit, preparation of permit applications, detailed design, supervision of construction and support of commissioning and acceptance of the overall CHP plant; project performed in cooperation with SEEGEN, Salzburg
Biomass CHP plant based on an ORC cycle, Dobbiaco (South Tyrol, Italy)	
Customer:	Fernheizwerk Toblach Gen.m.b.H., IT
Project period:	2002-2003
Technical specifications:	Nominal thermal capacity: 8.7 MW biomass thermal oil boiler + 0.5 MW pressurised hot water economiser + 2.4 MW flue gas condensation unit; nominal electric capacity: 1.5 MW ORC process
Scope of work:	Technical and economic optimisation of the CHP unit (ORC), detailed design of the ORC unit, support during supervision of construction and commissioning of the ORC unit; project performed in cooperation with SEEGEN/Salzburg
Biomass CHP plant based on an ORC cycle / Lanz, Mühlbach (South Tyrol, Italy)	
Customer:	Holzleimbau und Sägewerk GmbH Lanz, IT
Project period:	2001
Scope of work:	Preliminary design
Biomass CHP plant based on an ORC cycle / Tilo, Lohnsburg (Upper Austria, Austria)	
Customer:	G. Schrattenecker GesmbH & Co KG, AT
Project period:	2000
Scope of work:	Preliminary design, preparation of funding application, preparation of permit application and preparation of bids

Biomass CHP plant based on an ORC cycle / District heating plant Tamsweg (Salzburg, Austria)	
Customer:	Fernwärmeversorgungs GmbH Tamsweg, AT
Project period:	2000
Scope of work:	Preliminary design
Biomass CHP plant based on an ORC cycle / Chemometall (Vienna, Austria)	
Customer:	Chemometall Anlagenerrichtung KEG, AT
Project period:	2000
Scope of work:	Preliminary design, preparation of funding application
Waste wood-fired combined heat, cooling and power (CHCP) plant based on an ORC cycle and an absorption chiller, BIOSTROM, Fussach - national demonstration project (Vorarlberg, Austria)	
Customer:	Biostrom Erzeugungs GmbH, AT
Project period:	2000-2002
Technical specifications:	Nominal thermal capacities: 6.2 MW biomass thermal oil boiler + 1.0 MW pressurised hot water economiser; nominal electric capacity: 1.1 MW ORC process
Scope of work:	Preliminary design of the overall plant, preparation of applications for national funding; technical and economic optimisation of the CHP unit and the absorption chiller (combined heat, cooling and power plant); preparation of permit applications, detailed design, supervision of construction and support of commissioning and acceptance of the combined heat, cooling and power plant (ORC, absorption chiller) and hydronic installations
Biomass CHP plant based on an ORC cycle and a newly developed fuzzy logic control system / Stadtwärme Lienz - EU-THERMIE demonstration project (Tyrol, Austria)	
Customer:	Stadtwärme Lienz Produktions- und Vertriebs-GmbH, AT
Project period:	1998-2001
Technical specifications:	Nominal thermal capacities: 7.0 MW biomass pressurised hot water boiler + 6.0 MW biomass thermal oil boiler + 1.5 MW flue gas condensation unit; nominal electric capacity: 1.0 MW ORC process
Scope of work:	Preliminary design of the overall plant, preparation of applications for EU-THERMIE and national funding; technical and economic optimisation of the CHP unit, detailed design of the CHP plant, supervision of construction and support of commissioning and acceptance of the CHP plant
Biomass CHP plant based on an ORC cycle / STIA Holzindustrie, Admont - EU-THERMIE demonstration project (Styria, Austria)	
Customer:	STIA-Holzindustrie GmbH, AT
Project period:	1998-1999
Technical specifications:	Nominal thermal capacities: 4.0 MW biomass pressurised hot water boiler + 3.2 MW biomass thermal oil boiler + 1.5 MW flue gas condensation unit; nominal electric capacity: 0.4 MW ORC process
Scope of work:	Preliminary design of the overall plant, preparation of applications for EU-THERMIE and national funding; technical and economic optimisation of the CHP unit, detailed design of the ORC process, the flue gas cleaning unit and the flue gas condensation unit, supervision of construction and support of commissioning and acceptance of the ORC unit

Biomass combined heat and power plants based on a steam turbine process

Biomass CHP plant based on a steam turbine process, Enns (Upper Austria, Austria)	
Customer:	Donausäge Rumplmayr GmbH, AT
Project period:	2020-
Scope of work:	Rebuilding of the existing steam boiler plant and low temperature heat recovery as well as installation of a flue gas condensation unit. Technical and economic optimisation of the CHP unit
Biomass CHP plant based on a steam turbine process, Lauterbach (Hesse, Germany)	
Customer:	Pfeifer Holz GmbH, DE
Project period:	2019-2020
Scope of work:	Technical evaluation of the CHP unit
Biomass CHP plant based on a steam turbine process, Salzburg (Salzburg, Austria)	
Customer:	Salzburg AG, AT
Project period:	2019
Technical specifications:	Nominal thermal capacity: 7 MW biomass steam boiler; 9,5 MW biomass hot-water boiler; nominal electric capacity: 0.5 MW steam turbine; 2 MW flue gas condensation; 11 MW absorption heat pump
Scope of work:	Conception and plant layout
Biomass CHP plant based on a steam turbine process, Unterbernbach (Bavaria, Germany)	
Customer:	Pfeifer Holz GmbH, DE
Project period:	2017
Scope of work:	Technical and economic optimisation of the CHP unit and belt dryers
Biomass CHP plant based on a steam turbine process, Althofen (Carinthia, Austria)	
Customer:	Tilly Bioenergie Gesellschaft m. b. H., AT
Project period:	2016
Scope of work:	Preliminary design
Biomass CHP plant based on a steam turbine process / EVN AG, Baden (Lower Austria, Austria)	
Customer:	EVN AG, AT
Project period:	2016
Scope of work:	Preparation of permit applications for the installation of a flue gas condensation unit
Biomass CHP plant based on a steam turbine process, Ramingdorf (Lower Austria, Austria)	
Customer:	Bioenegie Steyr GmbH, AT
Project period:	2016
Scope of work:	Installation of a flue gas condensation unit Preparation of bidding documents
Biomass CHP plant based on a steam turbine process, Chanovice (Czech Republic)	
Customer:	Pfeifer Holz s.r.o., CZ
Project period:	2016-2020
Scope of work:	Rebuilding of the existing steam boiler plant and low temperature heat recovery as well as installation of a flue gas condensation unit. Technical and economic optimisation of the CHP unit, preparation of permit applications, detailed design, supervision of construction and support of commissioning and acceptance of the plant
Biomass CHP plant based on a steam turbine process, Siezenheim 2 (Salzburg, Austria)	
Customer:	Salzburg AG, AT
Project period:	2015
Technical specifications:	Nominal thermal capacity: 15 MW biomass steam boiler; nominal electric capacity: 4,24 MW steam turbine
Scope of work:	Conception, preparation of permit application of the biomass CHP plant

Biomass CHP plant based on a steam turbine process for Bioenergy-Point (Serbia)	
Customer:	3ES DOO BEOGRAD, SRB
Project period:	2015-2016
Technical specifications:	Nominal thermal capacity: 10,5 MW biomass steam boiler; nominal electric capacity: 2,1 MW steam turbine
Scope of work:	Conception, preparation of permit application and preparation of bids for the biomass CHP plant
Biomass CHP plant based on a steam turbine process, Altheim (Upper Austria, Austria)	
Customer:	Wiesner Hager Zentrale Dienste GmbH, AT
Project period:	2015
Scope of work:	Assessment of plant operation and development of a follow-up energy supply concept
Biomass CHP plant based on a steam turbine process, Kundl (Tyrol, Austria)	
Customer:	Pfeifer Holz GmbH & Co KG, AT
Project period:	2015-2017
Scope of work:	Rebuilding of the existing steam boiler plant and low temperature heat recovery as well as installation of a flue gas condensation unit including condensate treatment (bioreactor). Preparation of applications for national funding; technical and economic optimisation of the CHP unit, preparation of permit applications, detailed design, supervision of construction and support of commissioning and acceptance of the combined heat, cooling and power plant
Biomass CHP plant based on a steam turbine process, Plumas (California, USA)	
Customer:	Wisewood Inc., USA
Project period:	2014
Technical specifications:	Nominal thermal capacity: 12 MW biomass steam boiler; nominal electric capacity: 4 MW steam turbine
Scope of work:	Preliminary technical design of the CHP plant, 3D-planning
Biomass CHP plant based on a steam turbine process, Condino (Trent, Italy)	
Customer:	Condino Energia Srl, IT
Project period:	2013
Technical specifications:	Nominal thermal capacity: 14.8 MW biomass steam boiler; nominal electric capacity: 4.3 MW steam turbine
Scope of work:	Conception, preparation of permit application and preparation of requests for bids of the biomass CHP plant
Biomass CHP plant based on a steam turbine process, Kufstein (Tyrol, Austria)	
Customer:	Bioenergie Kufstein GmbH, AT
Project period:	2012-2014
Technical specifications:	Rebuilding of the existing steam boiler plant into a back-pressure turbine with a nominal electric capacity of 6.5 MW
Scope of work:	Preparation of applications for national funding; technical and economic optimisation of the CHP unit, preparation of permit applications, detailed design, supervision of construction and support of commissioning and acceptance of the plant
Biomass CHP plant based on a steam turbine process, VictoriaGroup-Serbia	
Customer:	Pro Energo, SRB
Project period:	2010
Scope of work:	Preliminary design
Biomass CHP plant based on a steam turbine process, Vösendorf (Lower Austria, Austria)	
Customer:	EVN Wärme GmbH, AT
Project period:	2010
Scope of work:	Optimisation steam cycle, preparation of permit applications

Biomass CHP plant based on a steam turbine process, Ramingdorf (Lower Austria, Austria)

Customer:	EVN Wärme GmbH, AT
Project period:	2009
Scope of work:	Preparation of permit applications, consulting service regarding the plant concept and support of supervision of construction and commissioning

Biomass CHP plant based on a steam turbine process, Caithness (Scotland)

Customer:	Summerleaze Ltd., UK
Project period:	2008
Scope of work:	Preliminary design

Biomass CHP plant based on a steam turbine process, Lower Saxony (Germany)

Customer:	Desmet Ballestra Ethanol GmbH, DE
Project period:	2008
Scope of work:	Preliminary design

Biomass CHP plant based on a steam turbine process, Spiez (Bern, Switzerland)

Customer:	sol-E Suisse AG, CH
Project period:	2008
Scope of work:	Preliminary design

Biomass CHP plant based on a steam turbine process, Bando di Argenta (Ferrara, Italy)

Customer:	San Marco Bioenergie S.p.A., IT
Project period:	2009
Scope of work:	Technical evaluation

Biomass CHP plant based on a steam turbine process, Crotone (Calabria, Italy)

Customer:	Biomasse Italia S.p.A., IT
Project period:	2008
Scope of work:	Economic evaluation

Biomass CHP plant based on a steam turbine process, Aschach (Upper Austria, Austria)

Customer:	Agrana Stärke GmbH, AT
Project period:	2007
Scope of work:	Preliminary design

CHP plant based on a steam turbine process using olive residues as fuel / New Energy Biomasse Hellas GmbH (Meligalas, Greece)

Customer:	New Energy Biomasse Hellas GmbH, GR
Project period:	2004-2007
Technical specifications:	Nominal thermal capacity: 100.0 MW biomass steam boiler; nominal electric capacity: 26.3 MW steam turbine; fuel: olive residues
Scope of work:	Preparation of EU project application, coordination support for EU demonstration project, EU project partner, preparation of permit applications in cooperation with Infratec S.A. and Impetus S.A. (GR), preparation of requests for bids and evaluation of bids and functional design specifications, assistance in the detailed design

Biomass CHP plant based on a steam turbine process / EVN AG, Mödling (Lower Austria, Austria)

Customer:	EVN AG, AT
Project period:	2004-2007
Technical specifications:	Thermal capacity: 23,4 MW biomass-steam boiler; electric capacity: 5.0 MW steam turbine
Scope of work:	Preliminary design of the overall plant, preparation of applications for national funding, preparation of permit applications, preparation of invitation to bid and evaluation of bids for the CHP plant; supervision of construction and support of commissioning and acceptance of the biomass furnace, steam boiler and flue gas cleaning system; project performed in cooperation with Verbundplan GmbH / Villach

Biomass CHP plant based on a steam turbine process / EVN AG, Baden (Lower Austria, Austria)	
Customer:	EVN AG, AT
Project period:	2004-2007
Technical specifications:	Thermal capacity: 23,4 MW biomass-steam boiler; electric capacity: 5.0 MW steam turbine
Scope of work:	Preliminary design of the overall plant, preparation of applications for national funding, preparation of permit applications, preparation of invitation to bid and evaluation of bids for the CHP plant; supervision of construction and support of commissioning and acceptance of the biomass furnace, steam boiler and flue gas cleaning system; project performed in cooperation with Verbundplan GmbH / Villach
Biomass CHP plant based on a steam turbine process, Voitsberg (Styria, Austria)	
Customer:	Steirische Fernwärme GmbH, AT
Project period:	2003
Scope of work:	Preliminary design
Biomass CHP plant based on a steam turbine process / S. Spitz GesmbH, Attnang-Puchheim (Upper Austria, Austria)	
Customer:	S. Spitz GesmbH, AT
Project period:	2003
Scope of work:	Preliminary design
Biomass CHP plant based on a steam turbine process / Holzindustrie Stallinger, Frankenmarkt (Upper Austria, Austria)	
Customer:	Holzindustrie Stallinger, AT
Project period:	2003-2005
Technical specifications:	Nominal thermal capacity: 24.5 MW biomass steam boiler; nominal electric capacity: 6.5 MW steam turbine
Scope of work:	Preliminary design of the overall plant, preparation of applications for national funding; preparation of permit applications and preparation of invitation to bid and evaluation of bids in cooperation with Energie AG O.Ö.
Biomass CHP plant based on a steam turbine process / Ennstal-Milch, Stainach (Styria, Austria)	
Customer:	Ennstal Milch KG, AT
Project period:	2003
Scope of work:	Preliminary design and preparation of permit applications
Biomass CHP plant based on a steam turbine process / Energie AG, Timelkam (Upper Austria, Austria)	
Customer:	Energie AG, AT
Project period:	2003
Scope of work:	Preparation of funding application
Biomass CHP plant based on a steam turbine process, Kufstein (Tyrol, Austria)	
Customer:	Tiroler Wasserkraft AG, AT
Project period:	2002-2004
Technical specifications:	Nominal thermal capacity: 18.7 MW biomass steam boiler; nominal electric capacity: 5.0 MW steam turbine
Scope of work:	Preparation of funding application, preparation of permit applications and CFD simulation
Biomass CHP plant based on a steam turbine process, Voitsberg (Styria, Austria)	
Customer:	Steirische Fernwärme GmbH, AT
Project period:	2001
Scope of work:	Preliminary design

Biomass CHP plant based on a steam turbine process / LINZ STROM GmbH, Linz (Upper Austria, Austria)

Customer:	Linz Strom GmbH, AT
Project period:	2001-2003
Technical specifications:	Nominal thermal capacity: 26.0 MW biomass steam boiler; nominal electric capacity: 7.0 MW steam turbine
Scope of work:	Preliminary design of the overall plant, preparation of applications for national funding; technical and economic optimisation of the CHP unit; preparation of permit applications, preparation of invitation to bid and evaluation of bids for the CHP plant, quality inspection of the unit after start-up

Biomass CHP plant based on a steam turbine process / Fuchsluger, Waidhofen (Upper Austria, Austria)

Customer:	Josef Fuchsluger, AT
Project period:	1999
Scope of work:	Preparation of funding application, preparation of permit applications in cooperation with Verbundplan

Biomass CHP plant based on a steam turbine process / Holzindustrie Preding (Styria, Austria)

Customer:	Holzindustrie Preding GmbH, AT
Project period:	1998
Scope of work:	Preliminary design, preparation of funding application and preparation of permit applications

Biomass combined heat and power plants based on a screw-type engine

Biomass CHP plant based on a screw-type engine cycle / Fernwärmeversorgungsgenossenschaft Hartberg (Styria, Austria)

Customer:	Fernwärmeversorgungsgenossenschaft Vitis, AT
Project period:	2019-
Technical specifications:	Nominal thermal capacity: 18.0 MW biomass steam boiler (4.5 MW for the screw-type engine process); nominal electric capacity: 0.5 MW screw-type engine
Scope of work:	Preparation of applications for national funding, preparation of permit applications, detailed design, supervision of construction, support of commissioning and acceptance of the CHP unit

Biomass CHP plant based on a screw-type engine cycle / Fernwärmeversorgungsgenossenschaft Hartberg – EU demonstration project (Styria, Austria)

Customer:	Fernwärmeversorgungsgenossenschaft Vitis, AT
Project period:	2001-2003
Technical specifications:	Nominal thermal capacity: 18.0 MW biomass steam boiler (5.6 MW for the screw-type engine process); nominal electric capacity: 0.71 MW screw-type engine
Scope of work:	Preliminary design of the overall plant, preparation of applications for EU and national funding, technical and economic optimisation of the CHP plant, preparation of permit applications, detailed design, supervision of construction, support of commissioning and acceptance of the CHP unit

Biomass combined heat and power plants based on Stirling engine technology

Biomass CHP plant based on Stirling engine technology, Allendorf (Hessen, Germany)

Customer:	Viessmann Werke GmbH & Co KG, DE
Project period:	2006-2009
Technical specifications:	Nominal thermal capacity: 0.24 MW biomass furnace (nominal thermal power output); nominal electric capacity: 0.035 MW
Scope of work:	Preliminary design of the overall CHP plant, preparation of permit applications, detailed design, supervision of construction and support of commissioning and acceptance of the overall CHP plant

Biomass CHP plant based on Stirling engine technology / TDZ Ennstal, Reichraming (Upper Austria, Austria)

Customer:	TDZ Ennstal, AT
Project period:	2005-2006
Technical specifications:	Nominal thermal capacity: 0.25 MW biomass furnace (nominal thermal power output); nominal electric capacity: 0.035 MW Stirling engine; wood chips and log wood drying system
Scope of work:	Preliminary design of the biomass CHP plant; preparation of applications for funding; preparation of permit applications; support of plant commissioning, plant monitoring

Combined heat and power plants based on vegetable oil

CHP plant based on vegetable oil-fired engines (combined heat and power units) and downstream ORC cycle / vegetable oil CHP New Energy (Germany)

Customer:	New Energy Hannover GmbH, DE
Project period:	2005
Technical specifications:	Nominal electric capacity vegetable oil-fired engines: 4.7 MW per unit; nominal electric capacity ORC process: 0.3 MW per unit; 5 units per site
Scope of work:	Preliminary design of the overall plant, preparation of permit applications; project performed in cooperation with concon GmbH

Biogas plants

Biogas production with dry fermentation; Lienz (Tyrol, Austria)

Customer:	Stadtwärme Lienz Produktions- und Vertriebs-GmbH, AT
Project period:	2020
Scope of work:	Feasibility study concerning substrate survey and technology evaluation

Optimisation guideline for biogas plants

Customer:	Lokale Energie Agentur Oststeiermark, AT
Project period:	2008
Scope of work:	Preparation of an optimisation guideline for biogas plants based on a systematic optimisation of the biogas plant development by strategic studying of realised plants and projects

Anaerobic reactor for the treatment of dairy waste water and for the production of biogas including the utilisation of biogas in a gas engine, Wörgl (Tyrol, Austria)

Customer:	Tirol Milch reg.Gen.m.b.H., AT
Project period:	2006
Scope of work:	Preliminary design

Biogas CHP plant based on agricultural waste with integrated gas treatment, Bad Tatzmannsdorf (Burgenland, Austria)

Customer:	Best Energy VertriebsgmbH, AT
Project period:	2006
Technical specifications:	Nominal electric capacity: 2 x 0.25 MW gas engines, nominal thermal capacity: 2 x 0.4 MW gas engine waste heat
Scope of work:	Preliminary plant design, technical and economic assessment of a biogas CHP plant based on agricultural waste with integrated gas treatment for biogas injection into an existing natural gas grid and utilisation in gas engines at the customer sites

Agricultural biogas CHP plant based on a gas engine, Saaz (Styria, Austria)

Customer:	RWP-Bioenergie GmbH, AT
Project period:	2005
Scope of work:	Monitoring

Biogas CHP plant based on agricultural waste with fuel cell and integrated gas treatment

Customer:	Internal project, AT
Project period:	2005
Technical specifications:	Nominal electric capacity: 0.25 MW fuel cell; nominal thermal capacity: 0.18 MW fuel cell waste heat (development phase)
Scope of work:	Preliminary plant design and conceptual design, technical and economic assessment

Biogas plant with integrated gas treatment for biogas injection into an existing natural gas grid

Customer:	Internal project, AT
Project period:	2005
Technical specifications:	Biogas treatment capacity: 200 Nm3/h (development phase)
Scope of work:	Preliminary plant design and conceptual design, technical and economic assessment

Biogas CHP plant based on agricultural waste with gas engine, Hídépítő (Hungary)

Customer:	Hídépítõ Rt., HU
Project period:	2005
Technical specifications:	Nominal electric capacity: 0.25 MW gas engine; nominal thermal capacity: 0.30 MW gas engine waste heat
Scope of work:	Preliminary plant and conceptual design, technical and economic assessment

Combination of an anaerobic waste water treatment plant and a biogas CHP plant for the energetic utilisation of organic residues, Enns (Upper Austria, Austria)

Customer:	Hermann Pfanner Getränke Ges.m.b.H., AT
Project period:	2005
Technical specifications:	Anaerobic waste water treatment plant: 685 m3 waste water/day; 5,200 kgCOD/day; nominal electric capacity (gas engine): 0.5 MW; nominal thermal capacity (gas engine): 0.57 MW; thermal biogas utilisation (substitution of natural gas): 100 m3/h
Scope of work:	Preliminary plant and conceptual design, technical and economic assessment, preparation of applications for funding of an anaerobic waste water treatment plant and a biogas CHP plant for the energetic utilisation of organic residues with biogas utilisation in a gas engine and feed-in of biogas into the company-internal natural gas grid

Biogas CHP plant based on agricultural waste with gas engine, Zwettl (Lower Austria, Austria)

Customer:	Fernwärme Waldviertel reg.Gen.m.b.H., AT
Project period:	2004
Technical specifications:	Nominal electric capacity: 0.5 MW gas engine, nominal thermal capacity: 0.57 MW gas engine waste heat
Scope of work:	Preliminary plant design, preparation of applications for national funding, preparation of permit applications

Pellets production plants

Pellet production plant for DIN+ wood pellets from saw dust, Enns (Upper Austria, Austria)

Customer:	Donausäge Rumplmayr GmbH, AT
Project period:	2020-
Scope of work:	Technical concept of the project

Pellet production plant for DIN+ wood pellets from saw dust, Münsterland (Germany)

Customer:	Cycleenergy Holding GmbH, AT
Project period:	2016
Scope of work:	Technical and economic evaluation of the project

Pellet production plant for DIN+ wood pellets from saw dust, Gresten (Lower Austria, Austria)

Customer:	Cycleenergy AG, AT
Project period:	2010
Technical specifications:	Pellet production capacity: 37,000 tons per year
Scope of work:	Support at the conception of the overall plant and the preparation of permit applications for the pellet plant. Project in cooperation with Cycleenergy AG (Vienna)

Pellet production plant for DIN+ wood pellets from wood chips and saw dust combined, Gaishorn (Styria, Austria)

Customer:	Cycleenergy Gaishorn GmbH, AT
Project period:	2010
Technical specifications:	Pellet production capacity: 40,000 tons per year
Scope of work:	Support at the conception of the overall plant and the preparation of permit applications for the pellet plant. Project in cooperation with Cycleenergy AG (Vienna)

Reconstruction and extension of the pellets production plant and integration of a biomass CHP plant, Stainach (Styria, Austria)

Customer:	Methanco Energie Beratung und Beteiligung GmbH, AT
Project period:	2009-2011
Technical specifications:	Pellet production capacity: 40,000 tons per year; nominal electric capacity of the gas engine: 800 kW
Scope of work:	Preliminary design and conception of the overall plant, preparation of permit applications, detailed design, supervision of construction, support of commissioning and acceptance of the pellet production plant and the CHP unit

Pellets production plant for DIN+ wood pellets (Caithness, Scotland)

Customer:	Summerleaze Ltd., UK
Project period:	2008
Technical specifications:	Pellet production capacity: 60,000 tons per year; nominal electric capacity of the steam turbine: 8 MW
Scope of work:	Preliminary design and conception of the overall plant, technical and economical evaluation

Pellets production plant for DIN+ wood pellets, Petrozavodsk (Karelia, Russia)

Customer:	Borodino Company, RU
Project period:	2008
Technical specifications:	Pellet production capacity: 20.000 and 40.000 tons per year, respectively
Scope of work:	Preliminary design and conception of the overall plant, technical and economical evaluation in cooperation with PROMANAGEMENT GmbH

Biomass gasification and pyrolysis plants

Plant for combined biochar, heat and electricity production from solid biomass, Horn (Lower Austria, Austria)

Customer:	Biogas Waldviertel EV G.m.b.H., AT
Project period:	2018-2019
Technical specifications:	Biochar production: 580 kg / h; Nominal thermal output: 2.2 MW; Nominal electrical power: 0.5 MW ORC process
Scope of work:	Technical concept of the entire system, submission of national funding, energetic optimization of the entire system, preparation of permit applications

Technology for the combined generation of biochar, heat and electricity from biomass for the company POLYTECHNIK Luft- und Feuerungstechnik GmbH, Weissenbach (Lower Austria, Austria)	
Customer:	POLYTECHNIK Luft- und Feuerungstechnik GmbH, AT
Project period:	2017-2019
Technical specifications:	Feedstock: wood chips; biochar production capacity: 3.000 t/a; nominal thermal power (hot water, steam, thermal oil): 1.3 MW
Scope of work:	Development of 3D CFD models for the transient simulation of pyrolysis reactors; CFD supported development and optimisation of the pyrolysis reactor and the pyrolysis gas burners; CFD supported optimisation of the drying unit
Enhanced catalytic fast pyrolysis of biomass for maximum production of high-quality biofuels (EnCat)	
Funding authority:	Austrian Research Promotion Agency (FFG, Project number 857198), AT
Project period:	01.01.2017 - 31.08.2020
Scope of work:	Pyrolysis oil burner development. Development and techno-economic evaluation of the overall concept for combined bio-oil, heat and electricity production
Biomass CHP plant based on wood gasification Wiehag, Altheim (Upper Austria, Austria)	
Customer:	Wiehag GmbH, AT
Project period:	2018-
Technical specifications:	Nominal thermal capacity: 1 MW ; nominal electric capacity: 0.5 MW
Scope of work:	Technical concept, preparation of permit applications and technology comparison for biomass fixed-bed gasifiers and gas cleaning
Energetic utilisation of Sargassum seaweed	
Customer:	Gesellschaft für internationale Zusammenarbeit (GIZ), DE
Project period:	2015
Scope of work:	Pre-feasibility study regarding the energetic utilisation of Sargassum seaweed from the Caribbean Sea based on hydrothermal carbonisation (HTC) and pyrolysis
Biomass-CHP plant based on wood gasification, Mühlbach (South Tyrol, Italy)	
Customer:	Konrad Lanz GmbH, IT
Project period:	2012
Scope of work:	Technical concept and economic evaluation
Biomass-CHP plant based on wood gasification, Leogang (Salzburg, Austria)	
Customer:	Hartl Holz GmbH, AT
Project period:	2011
Scope of work:	Technical evaluation
Biomass-CHP plant based on wood gasification, Olang (South Tyrol, Italy)	
Customer:	Fernheizwerk Olang GmbH, IT
Project period:	2011
Scope of work:	Technical concept and economic evaluation
Technical, ecological und economic evaluation of new biomass fixed bed gasification technologies	
Customer:	Viessmann Werke GmbH & Co KG, DE
Project period:	2007-2008
Scope of work:	Technical, ecological and economic evaluation
Biomass methanisation plant (production of Bio-SNG) based on a CFB steam gasification process Güssing (Burgenland, Austria); Engineering thermal oil cycle	
Customer:	REPOTEC Umwelttechnik GmbH - renewable power technologies, AT
Project period:	2007
Technical specifications:	Product gas input: 1.6 MWth; production of synthetic natural gas (Bio-SNG): 140 Nm^3/h
Scope of work:	Detailed design of the thermal oil system. Project in cooperation with REPOTEC - Renewable Power Technologies Umwelttechnik GmbH

Biomass CHP plant based on the integration of an ORC-process into a CFB steam gasification process, Oberwart (Burgenland, Austria)

Customer:	REPOTEC Umwelttechnik GmbH - renewable power technologies, AT
Project period:	2004
Technical specifications:	Fuel input biomass gasification: 8.31 MW; nominal electric capacities: 2.38 MW gas engines and 0.48 MW ORC
Scope of work:	Preliminary design, preparation of permit applications. Project in cooperation with REPOTEC - Renewable Power Technologies Umwelttechnik GmbH

Cold production and distribution

Biomass CHP plant based on an ORC cycle, Karyes Mount Athos, Greece)

Customer:	Holy and Great Monastery of Vatopaidi, GR
Project period:	2012-2015 and 2017-2018
Technical specifications:	Nominal thermal capacity: 1.6 MW biomass thermal oil boiler + 0.3 MW thermal oil economiser; nominal electric capacity: 300 kW ORC process; nominal chilling capacity: 1 MW
Scope of work:	Preliminary design of the overall CHP plant, preparation of permit applications, detailed design

Optimised design of chilling plants under special consideration of waste heat utilization using the example of the City of Vienna

Customer:	Fernwärme Wien GmbH, AT
Project period:	2009
Scope of work:	Conception of an energetically, technically, economically and ecologically optimised chilling plant within the program "Neue Energien 2020" of the Austrian Energy and Climate Fund; Project name: „optimised design of chilling plants under special consideration of waste heat utilization using the example of the City of Vienna"

Combined heat, cooling and power (CHCP) plant based on existing CHP plants and district heating systems as well as absorption and compression chillers / cooling plant Vienna central railway station (Vienna, Austria)

Customer:	Fernwärme Wien GmbH, AT
Project period:	2008
Technical specifications:	Nominal chilling capacity: 20 MW; recooling by open cooling towers, nominal recooling capacity: 34.2 MW; heat supply for the absorption chillers by district heating
Scope of work:	Preliminary design and plant conception

Combined heat, cooling and power (CHCP) plant based on existing CHP plants and district heating systems as well as absorption and compression chillers / cooling plant Spittelau (Vienna, Austria)

Customer:	Fernwärme Wien GmbH, AT
Project period:	2007
Technical specifications:	Nominal chilling capacity: 17 MW; recooling by river-water cooling, nominal cooling capacity recooling: 31.8 MW; heat supply for the absorption chillers by district heating
Scope of work:	Technical conception and preparation of requests for bids

Biomass combined heat, cooling and power (CHCP) plant based on an absorption chiller, VW plant Salzgitter (Lower Saxony, Germany)

Customer:	HAWK Fakultät Ressourcenmanagement; FH Hildesheim/Holzminden/Göttingen, DE
Project period:	2005
Technical specifications:	Nominal chilling capacity: 4 MW; recooling with open cooling towers, nominal cooling capacity of the cooling towers: 10 MW; heat supply for the absorptions chillers by hot water
Scope of work:	Preliminary design and plant conception

Waste wood-fired combined heat, cooling and power (CHCP) plant based on an ORC cycle and an absorption chiller / BIOSTROM, Fussach - national demonstration project (Vorarlberg, Austria)

Customer:	Biostrom Erzeugungs GmbH, AT
Project period:	2000-2002
Technical specifications:	Nominal heating capacity: 6.2 MW biomass thermal oil boiler + 1.0 MW hot water economiser; nominal electric capacity: 1.1 MW ORC unit
Scope of work:	Technical preliminary design of the overall plant, preparation of applications for national funding, energetic and economic optimisation of the combined heating cooling and power generation (combined process of an ORC and an absorption chiller), preparation of permit applications, detailed design, supervision of construction and support of commissioning and acceptance of the overall CHCP plant. (ORC, adsorption chiller) and the hydronic system

Sustainable ash utilisation

Regional utilisation of wood ash - feasibility study for the Leader region Holzwelt Murau (Styria, Austria)

Customer:	Umweltbundesamt GmbH, AT
Project period:	2016
Scope of work:	Feasibility study for the regional utilisation of wood ashes from biomass plants in the region of Murau

Development of innovative processes for wood ash utilisation

Funding authority:	Austrian Research Promotion Agency (FFG), AT
Project period:	2009-2014
Scope of work:	Development of innovative processes for wood ash utilization. Project within the "Collective Research" program of the Austrian Research Promotion Agency (FFG) to evaluate and develop innovative processes for wood ash utilization. Main goals: • Development of environmentally friendly and ready-to-use recycling processes for wood ash under consideration of already available results from national and international research projects. • Evaluation of the complete process chain from combustion technology to treatment, logistics, transport and recycling of the ashes with the aim to close the mineral cycle while considering environmental and economic feasibility. • Comprehensive evaluation and assessment of technological, agricultural as well as pedological aspects under consideration of the legal framework conditions and the economic feasibility in order to provide the basis for the implementation of the project results in legal guidelines, ordinances or laws. • Focus on the following wood ash utilisation processes - Use as a fertilising agent (additive to composting) - Spreading technology on agricultural and forest land - Use as a construction material (forest road construction, soil stabilisation)

Reduction of the Heavy Metals Content in Bottom Ashes from Biomass Installations

Customer:	EnBW Energie Baden-Württemberg AG, DE
Project period:	2009
Scope of work:	Research project regarding the reduction of the heavy metal contents in grate ashes from biomass combustion plants

EDF ash study (Chatou, France)

Customer:	EDF, FR
Project period:	2008
Scope of work:	Preparation of a study regarding ash related problems in biomass combustion plants as well as evaluation of selected plant manufacturers regarding the state-of-the-art concerning the reduction of ash related problems in fixed-bed biomass combustion systems

Utilisation of wood ash in biomass combustion plants - FHP ash study

Customer:	Kooperationsplattform Forst Holz Papier, AT
Project period:	2008
Scope of work:	Preparation of a study concerning the utilisation of wood ashes from biomass CHP and heating plants in Austria

Analysis and evaluation of the bottom and cyclone fly ash of the biomass CHP plant in Lienz (Tyrol, Austria)

Customer:	Stadtwärme Lienz Produktions- und Vertriebs-GmbH, AT
Project period:	2003
Scope of work:	Preparation of an ash utilisation and logistics concept for the biomass district heating plant Lienz (Tyrol, Austria)

CFD SIMULATIONS

Small-scale furnaces and stoves

Low-emission micro-scale pellet stove with innovative process control of the company RIKA Innovative Ofentechnik GmbH, Micheldorf (Upper Austria, Austria)

Funding authority:	ERA-NET Bioenergy; Austrian Research Promotion Agency (FFG, Project number 869726), AT
Project period:	2019-2021
Technical specifications:	Power range: 1 - 4 kW; fuel: pellets
Scope of work:	CFD supported development of a pellet stove with extremely low load; grate simulations with a detailed bed model

Novel and extended characterisation of wood pellets and combustion modelling (FuturePelletSpec)

Customer:	Technologie- und Förderzentrum im Kompetenzzentrum für Nachwachsende Rohstoffe, DE
Project period:	2019-2021
Technical specifications:	Pellet boilers and stoves
Scope of work:	Supporting R&D activities; development of a non-DPM based transient and locally resolved packed-bed and release model for pellet furnaces

Development of a high-efficiency flue gas condenser for a pellets-wood chips hybrid furnace for the company SL-Technik GmbH, St. Pantaleon (Upper Austria, Austria)

Customer:	SL-Technik GmbH, AT
Project period:	2019-
Technical specifications:	Power range flue gas condenser: appr. 10 to 120 kW; fuels: wood chips, pellets
Scope of work:	CFD supported development and scaling of a new flue gas condenser to be coupled to a biomass furnace

Highly efficient low-emission wood-chip and pellet hybrid furnace technology for the company SL-Technik GmbH, St. Pantaleon (Upper Austria, Austria)

Customer:	SL-Technik GmbH, AT
Project period:	2018-
Technical specifications:	Power range: 20-500 kWth; fuels: wood chips, pellets
Scope of work:	CFD supported furnace development and CFD supported integration of an electrostatic precipitator directly in the boiler; CFD supported scaling

Ultra-clean pellet stove technology for the company RIKA Innovative Ofentechnik GmbH, Micheldorf (Upper Austria, Austria)

Customer:	RIKA Innovative Ofentechnik GmbH, AT
Project period:	2018-
Technical specifications:	Power range: up to 10 kWth; fuels: pellets
Scope of work:	CFD supported stove development

Fuel flexible furnaces for the small and medium-scale power range for the companies KWB Kraft & Wärme aus Biomasse GmbH, St. Margarethen/Raab (Styria, Austria) und POLYTECHNIK Luft- und Feuerungstechnik GmbH, Weissenbach (Lower Austria, Austria) (ERA-NET Bioenergy-project)

Funding authority:	ERA-NET Bioenergy Austrian Research Promotion Agency (FFG, project number 852050), AT
Project period:	2016-2019
Scope of work:	CFD supported development of fuel flexible furnaces for small and medium-scale power range

Fireplace insert of the company RIKA Innovative Ofentechnik GmbH, Micheldorf (Upper Austria, Austria)

Customer:	RIKA Innovative Ofentechnik GmbH, AT
Project period:	2016-2017
Technical specifications:	Nominal power range: 5-12 kW; fuel: log wood
Scope of work:	CFD supported actual state and sensitivity analysis of a fireplace insert; development and test of a new wood log release model

Fuel flexible, highly efficient and Ultra-Low emission biomass small-scale furnace technology based on a fixed bed updraft gasifier - Horizon 2020-Project "FlexiFuel-CHX"

Funding authority:	European Commission (Horizon 2020. GA No. 654446)
Project period:	2016-2018
Technical specifications:	Power range: 20-100 kW; fuels: pellets, different wood chip qualities, short rotation crops (poplar, willow), miscanthus and agricultural residues (e.g. kernels, shells, agropellets)
Scope of work:	CFD supported combustion chamber development and optimisation of the condenser; supporting high temperature thermodynamic equilibrium calculations to increase fuel flexibility

Log wood stove connected to a latent heat storage device for the company RIKA Innovative Ofentechnik GmbH, Micheldorf (Upper Austria, Austria)

Funding authority:	ERA-NET Bioenergy / KLIEN, KPC B466076
Project period:	2015-2016
Technical specifications:	Fuel power: 8,7 kW; fuel: log wood
Scope of work:	CFD supported optimisation of the stove and the downstream latent heat storage device

Micro-scale biomass CHP technology for pellet stoves of the company RIKA Innovative Ofentechnik GmbH, Micheldorf (Upper Austria, Austria)

Funding authority:	ERA-NET Bioenergy; Austrian Research Promotion Agency (FFG, Project number 843799), AT
Project period:	2014-2017
Technical specifications:	Power range: 25-50 kWel; fuel: pellets
Scope of work:	CFD based development and optimisation of a pellet stove with an integrated thermoelectric generator

Optimisation of the log wood boiler LogWIN LWP 300 of the company Windhager, Seekirchen (Salzburg, Austria)

Customer:	Windhager Zentralheizung Technik GmbH, AT
Project period:	2014
Technical specifications:	Nominal thermal capacity: 30 kW; fuel: log wood
Scope of work:	CFD aided optimisation of the log wood furnace with fire tube hot water boiler

Development of a new wood Ultra-Low-Dust chip furnace technology of the company Windhager Zentralheizung GmbH in the small to medium-scale power range, Seekirchen (Salzburg, Austria)

Customer:	Windhager Zentralheizung GmbH, AT
Project period:	2013-2015
Technical specifications:	Thermal power: 20-150 kW; fuel: wood chips
Scope of work:	CFD based technology development and stepwise optimisation

Highly efficient heating systems with small biomass combustion systems (SmartResidentialHeat) of the company GUNTAMATIC Heiztechnik GmbH, Peuerbach (Upper Austria, Austria)

Funding authority:	e!MISSION.at – 1st Call (Project number: 838674)
Project period:	2013-2015
Technical specifications:	Nominal thermal load 15 kW
Scope of work:	CFD-based furnace and boiler development including transient simulations

Evaluation of a pellet furnace for conventional and torrefied pellets - EU project "SECTOR"

Funding authority:	European Commission (7th Framework Programme, GA Nr. 282826)
Project period:	2013-2014
Technical specifications:	Nominal boiler load: 20 kW
Scope of work:	Performance of detailed fuel bed simulations for conventional and torrefied wood pellets with a particle layer model

Quench based biomass small-scale boiler technology for the company KWB Kraft & Wärme aus Biomasse GmbH, St. Margarethen/Raab (Styria, Austria)

Customer:	KWB Kraft & Wärme aus Biomasse GmbH, AT
Project period:	2012-2014
Technical specifications:	Power range: up to 300 kWth; fuels: wood chips, pellets
Scope of work:	CFD based development of an innovative wood-chips/pellet combinational furnace including a fuel gas quench; development and application of a new DPM based spray model for the simulation of droplet evaporation

Combined log wood/pellets stove of the company RIKA Innovative Ofentechnik GmbH, Micheldorf (Upper Austria, Austria)

Customer:	RIKA Innovative Ofentechnik GmbH, AT
Project period:	2012-2014
Technical specifications:	Nominal power: 8 kW; fuels: log wood, pellets
Scope of work:	CFD based actual state and sensitivity analysis

Log wood stove combined with different heat storage devices (gas/gas, gas/water, gas/storage medium) of the company RIKA Innovative Ofentechnik GmbH, Micheldorf (Upper Austria, Austria)

Customer:	RIKA Innovative Ofentechnik GmbH, AT
Project period:	2012-2014
Technical specifications:	Nominal fuel power: 9,1 kW
Scope of work:	CFD supported development of a log wood stove combined with different heat storage devices

Biomass small-scale CHP technology development; ETA Heiztechnik GmbH, Hofkirchen an der Trattnach (Upper Austria, Austria)

Customer:	ETA Heiztechnik GmbH, AT
Project period:	2012-2014
Technical specifications:	50 kW; 10 kWel
Scope of work:	CFD based furnace and boiler development

Biomass small-scale furnace technology with Ultra-Low emissions - EU project "UltraLowDust"

Funding authority:	European Commission (Framework Programme 7, Project No 268189)
Project period:	2012-2013
Technical specifications:	Power range: up to 100 kWth
Scope of work:	CFD supported development of a fixed bed gasifier with downstream gas boiler

Air heating system based on a pellet stove of the company RIKA Innovative Ofentechnik GmbH, Micheldorf (Upper Austria, Austria)

Customer:	RIKA Innovative Ofentechnik GmbH, AT
Project period:	2012-2013
Technical specifications:	Nominal thermal power: 10 kW; fuel: pellets
Scope of work:	CFD based technology development

Log wood stove with integrated small-scale heat storage device of the company RIKA Innovative Ofentechnik GmbH, Micheldorf (Upper Austria, Austria)

Customer:	RIKA Innovative Ofentechnik GmbH, AT
Project period:	2011-2013
Technical specifications:	8 - 10 kW
Scope of work:	CFD based stationary simulation of the log wood stove and transient simulation of the heat storage behaviour

Low-dust and low-NOx-pellet biomass boilers based on an innovative air staging technology in combination with flue gas recirculation for the company KÖB Holzheizsysteme GmbH, Wolfurt (Vorarlberg, Austria)

Customer:	KÖB Holzheizsysteme GmbH, AT
Project period:	2011-2013
Technical specifications:	Nominal thermal power: 12 kW
Scope of work:	CFD based furnace and boiler development

Pellet boiler with Ultra-Low emissions by primary measures for the company Windhager Zentralheizung GmbH, Seekirchen (Salzburg, Austria)

Customer:	Windhager Zentralheizung GmbH, AT
Project period:	2010-2012
Technical specifications:	Nominal thermal load: 15-70 kW
Scope of work:	Development, first validation and optimisation of a CFD based tar decomposition and N-release model as well as the application to a pellet gasifier; CFD simulation of the new combustion chamber of the pellet gasifier with improved cooling and multiple air staging; scale-up of the pellet gasifier

Development of a prototype of a new low-NOx 100 kW pellet furnace of the company Fröling Heizkessel- und Behälterbau GmbH, Grieskirchen (Upper Austria, Austria)

Customer:	Fröling Heizkessel- und Behälterbau GmbH, AT
Project period:	2010-2011
Technical specifications:	Nominal thermal capacity: 100 kW; fuel: wood pellets
Scope of work:	CFD supported technology development of a biomass fixed bed furnace with fire tube boiler

Development of a prototype of a new pellet furnace for low-energy houses of the company Windhager Zentralheizung GmbH, Seekirchen (Salzburg, Austria)

Customer:	Windhager Zentralheizung GmbH, AT
Project period:	2009-2010
Technical specifications:	Nominal thermal capacity (hot water boiler): 1,7 to 6 kW; fuel: wood pellets
Scope of work:	Simulation and support of the design and optimisation of the biomass fixed bed furnace with fire tube boiler

Low-dust biomass small-scale furnace based on primary and secondary measures for the company Viessmann Werke GmbH & Co KG, Allendorf (Hesse, Germany)

Customer:	Viessmann Werke GmbH & Co KG, DE
Project period:	2009-2010
Technical specifications:	20 kW pellet boiler
Scope of work:	CFD based technology development

Development of a low-NOx pellet furnace of the company Windhager Zentralheizung GmbH, AT	
Customer:	Windhager Zentralheizung GmbH, AT
Project period:	2008
Technical specifications:	18 kW pellet furnace
Scope of work:	CFD based NOx simulation and comparison with measurement data
Evaluation of a modified pellet boiler of the company Viessmann Werke GmbH & Co KG, Allendorf (Hesse, Germany)	
Customer:	Viessmann Werke GmbH & Co KG, DE
Project period:	2008
Technical specifications:	24 kW pellet furnace
Scope of work:	CFD based actual state and sensitivity analysis
Multi-fuel furnace of the company KWB Kraft & Wärme aus Biomasse GmbH, St. Margarethen/Raab (Styria, Austria)	
Customer:	KWB Kraft & Wärme aus Biomasse GmbH, AT
Project period:	2007-2009
Technical specifications:	Nominal thermal capacity (hot water boiler): 8 to 120 kW; applicable for woody and herbaceous biomass fuels: e.g. wood chips, wood pellets, olive residues, Miscanthus etc.)
Scope of work:	CFD based technology development
Stoves "i-series" of the company HAAS + SOHN OFENTECHNIK GMBH, Puch (Salzburg, Austria)	
Customer:	HAAS + SOHN OFENTECHNIK GMBH, AT
Project period:	2007-2009
Technical specifications:	Nominal thermal capacity: 8 kW; fuel: log wood
Scope of work:	Simulation and support of the design and optimisation of a log wood fired stove
Development of a prototype of a new pellet furnace of the company Windhager Zentralheizung GmbH, Seekirchen (Salzburg, Austria)	
Customer:	Windhager Zentralheizung GmbH, AT
Project period:	2007-2009
Technical specifications:	Nominal thermal capacity (hot water boiler): 15 kW; fuel: wood pellets
Scope of work:	CFD based technology development
Development of different small-scale pellet furnaces of the company Viessmann Werke GmbH & Co KG, Allendorf (Hesse, Germany)	
Customer:	Viessmann Werke GmbH & Co KG, DE
Project period:	2007-2009
Technical specifications:	Nominal thermal capacity (hot water boiler): 12 to 150 kW; fuel: wood pellets
Scope of work:	CFD based technology development
Development of different small-scale log wood furnaces of the company Viessmann Werke GmbH & Co KG, Allendorf (Hessen, Germany)	
Customer:	Viessmann Werke GmbH & Co KG, DE
Project period:	2007-2008
Technical specifications:	Nominal thermal capacity: up to 80 kW; fuel: log wood
Scope of work:	CFD based technology development

Pellet and wood chip-fired furnace of KWB Kraft & Wärme aus Biomasse GmbH, St. Margarethen/Raab (Styria, Austria)

Customer:	KWB Kraft & Wärme aus Biomasse GmbH, AT
Project period:	2002-2003
Technical specifications:	Nominal thermal capacity: 150 kW biomass hot water boiler; fuels: wood chips and wood pellets
Scope of work:	CFD supported simulation and support of the design and optimisation. Introduced into the market as KWB TDS Powerfire 150 boiler series, received the “Energie Genie 2004” award from the Austrian Ministry of the Environment in co-operation with the regional energy agency “O.Oe. Energiesparverband” as well as the “Energy Globe Award 2004” (special category “most innovative product”); Rotary grate furnace with a cyclone combustion chamber and fire tube boiler

Industrial combustion plants

Development of a combined dust and direct firing system for the company Standardkessel GmbH, Duisburg (Nordrhein-Westfalen, Germany)

Customer:	Standardkessel GmbH, DE
Project period:	2021
Technical specifications:	30 - 40 MW
Scope of work:	CFD-based technology development

Grate furnace for Solid Recovered Fuel (SRF) for the company VYNCKE ENERGIETECHNIEK N.V., Harelbeke (West Flanders, Belgium)

Customer:	VYNCKE ENERGIETECHNIEK N.V., BE
Project period:	2020
	Nominal thermal load: 10 MW; fuel: Solid Recovered Fuel
Specifications / scope overview:	Simulation and support of the design and optimisation of a water cooled grate furnace with hot water boiler

Grate furnace for very dry and very wet fuels for the company POLYTECHNIK Luft- und Feuerungstechnik GmbH, Weissenbach (Lower Austria, Austria)

Customer:	POLYTECHNIK Luft- und Feuerungstechnik GmbH, AT
Project period:	2018
Technical specifications:	Nominal thermal power: 8 MW; fuels: wood chips M10 - M55
Scope of work:	CFD based actual state analysis and stepwise optimisation of the grate furnace with hot water boiler

Biomass grate furnace under normal operation conditions as well as under extreme air staging conditions for the company Hillerød Forsyning, Hillerød (Denmark)

Customer:	Hillerød Forsyning, DK
Project period:	2017
Technical specifications:	Nominal load: 12.5 MW
Scope of work:	CFD supported technology development

Biomass grate furnace under normal operation conditions as well as under extreme air staging conditions for the company Marstal Fjernvarme a.m.b.a., Marstal (Denmark)

Customer:	Marstal Fjernvarme a.m.b.a., DK
Project period:	2017
Technical specifications:	Nominal load: 4 MW
Scope of work:	CFD supported technology development

NOx emission reduction of an existing biomass grate furnace for the company Euro Therm A/S, Tranbjerg (Denmark)

Customer:	Euro Therm A/S, DK
Project period:	2017
Technical specifications:	Nominal power: 10 MW; fuel: virgin wood chips (M30 – M50)
Scope of work:	CFD supported evaluation and optimisation of an existing fixed-bed biomass furnace concerning the operating conditions for low NOx emissions

Biomass combustion technology for agricultural biomass fuels for the company POLYTECHNIK Luft- und Feuerungstechnik GmbH, Weissenbach (Lower Austria, Austria)

Customer:	POLYTECHNIK Luft- und Feuerungstechnik GmbH, AT
Project period:	2016-2020
Technical specifications:	Capacity range: 1 to 30 MWth; for agricultural biomass fuels
Scope of work:	CFD supported technology development for straw and rice husks combustion

Biomass grate furnace with thermal oil boiler of the company Euro Therm A/S, Tranbjerg (Denmark)

Customer:	Euro Therm A/S, DK
Project period:	2016-2017
Technical specifications:	Nominal load: 2 x 10 MW; fuel: wood chips
Scope of work:	CFD based actual state and sensitivity analysis of a woodchips furnace combined with a thermo-oil boiler as well as the evaluation of the plant with regard to extreme air staging

Evaluation of the operation of the biomass furnace of Bäuerliche Biowärmelieferungsgenossenschaft Irdning reg. Gen.mbH, Irdning (Styria, Austria)

Customer:	URBAS Maschinenfabrik GmbH, AT
Project period:	2016
Technical specifications:	Nominal load: 3.25 MW; fuel: woodchips
Scope of work:	CFD based technology optimisation

Fuel-flexible biomass boiler based on extreme air-staging of POLYTECHNIK Luft- und Feuerungstechnik GmbH, Weissenbach (Lower Austria, Austria)

Funding authority:	Austrian Research Promotion Agency (FFG, Project number 848841), AT
Project period:	2015-2017
Technical specifications:	Nominal thermal load: 300-1,000 kW; woody and non-woody fuels
Scope of work:	CFD based technology development

CFD based model for the design and optimization of porous burners for biomass combustion plants

Funding authority:	Austrian Research Promotion Agency (FFG, Project number 852652, 858291), AT
Project period:	2015-2017
Scope of work:	Model development and validation based on test runs

Evaluation of the corrosion potential of a biomass boiler - case study for a plant of the company Josef Bertsch GmbH & Co KG, Bludenz (Vorarlberg, Austria)

Funding authority:	Research project Bio-CorrSim
Project period:	2015-2016
Scope of work:	Development of a detailed corrosion model for 3D CFD simulations and application for a selected case study

Development of a new boiler series in the medium power range for the company KÖB Holzheizsysteme GmbH, Wolfurt (Vorarlberg, Austria)

Customer:	KÖB Holzheizsysteme GmbH, AT
Project period:	2015
Technical specifications:	Power range: 390 till 1,250 kW; fuels: pellets, wood chips (till M50)
Scope of work:	CFD based technology development

Flexi-fuel low-emission biomass combustion technology for the company Viessmann Holzfeuerungsanlagen GmbH, Hard (Vorarlberg, Austria)

Customer:	Viessmann Holzfeuerungsanlagen GmbH, AT
Project period:	2014-2017
Technical specifications:	Power range: 850 kWth till 20 MWth; fuels: wood chips (till M50), SRC (e.g. poplar, willow) and agricultural fuels (e.g. olive stones, miscanthus)
Scope of work:	CFD based technology development

Combined dust-injection/grate furnace for wood fuels for the company Mawera Holzfeuerungsanlagen GmbH, Hard (Vorarlberg, Austria)

Customer:	Viessmann Holzfeuerungsanlagen GmbH, AT
Project period:	2014-2015
Technical specifications:	Nominal thermal load: 3-5 MW; fuel: wastes from furniture industry
Scope of work:	CFD based technology development

Low emission biomass grate furnace technology for fuels with very high moisture content for the company Josef BINDER Maschinenbau- und Handelsges.m.b.H., Bärnbach (Styria, Austria)

Customer:	Josef BINDER Maschinenbau- und Handelsges.m.b.H., AT
Project period:	2012-2014
Technical specifications:	Nominal load: 1 MW
Scope of work:	CFD based technology development

Biomass combustion technology with extreme air staging of POLYTECHNIK Luft- und Feuerungstechnik GmbH, Weissenbach (Lower Austria, Austria)

Customer:	POLYTECHNIK Luft- und Feuerungstechnik GmbH, AT
Project period:	2012-2014
Technical specifications:	Capacity range: up to 20 MWth; fuel: wood chips
Scope of work:	CFD supported technology development

Straw-wood co-firing for the company Standardkessel GmbH, Duisburg (North Rhine-Westphalia, Germany)

Customer:	Standardkessel GmbH, DE
Project period:	2012-2013
	Nominal load: 50 MWth
Scope of work:	CFD supported technology development

Sewage sludge cyclone furnace for the company Andritz AG, Graz (Styria, Austria)

Customer:	Andritz AG, AT
Project period:	2012
Technical specifications:	Fuel power: 2.87 MW; fuel: sewage sludge
Scope of work:	Further development of an in-house CFD model for a sewage sludge cyclone furnace and performance of CFD simulations for technology optimisation

Biomass grate furnace technology for fuels with high water and ash contents for the company Mawera Holzfeuerungsanlagen Gesellschaft m.b.H, Hard (Vorarlberg, Austria)

Customer:	Mawera Holzfeuerungsanlagen Gesellschaft m.b.H, AT
Project period:	2011-2013
Technical specifications:	Nominal thermal capacity: 700 kW - 13 MW; fuels: biomass fuels with high water and ash contents (freshly harvested short rotation coppice, wood chips with high contents of bark, needles and mineral impurities, landscape preservation wood, stools)
Scope of work:	CFD supported development of a biomass grate furnace with hot water / steam / thermal oil boiler

Evaluation of the influence of ash deposits to flow and combustion conditions in the existing plant Altweitra (Lower Austria, Austria)

Customer:	POLYTECHNIK Luft- und Feuerungstechnik GmbH, AT
Project period:	2011
Technical specifications:	Nominal load: 10.7 MW; fuel: wood chips
Scope of work:	CFD based evaluation of the influence of ash deposits inside a 3 duct furnace on the combustion process and the plant control

Wood chips grate furnace in combination with a flue gas quench for the company POLYTECHNIK Luft- und Feuerungstechnik GmbH, Weissenbach (Lower Austria, Austria)

Customer:	POLYTECHNIK Luft- und Feuerungstechnik GmbH, AT
Project period:	2010-2013
Technical specifications:	Nominal fuel capacity: 250 kW; fuel: wood chips
Scope of work:	CFD supported technology development

CHP plant based on a hybrid biomass and solar system with ORC process - EU demonstration project "Sunstore 4"

Funding authority:	European Commission (7th Framework Programme, GA Nr. 249800)
Project period:	2010-2011
Technical specifications:	Nominal thermal capacity: 3.24 MW (thermal oil boiler) + 0.91 MW (thermal oil economiser); nominal electric capacity ORC process: 750 kW; fuel: short rotation coppice (willow)
Scope of work:	CFD simulation and support of the design and optimisation of the biomass grate furnace with thermal oil boiler

Low-NOx furnace for „new“ biomass fuels of the company Josef BINDER Maschinenbau- und Handelsges.m.b.H., Bärnbach (Styria, Austria)

Customer:	Josef BINDER Maschinenbau- und Handelsges.m.b.H., AT
Project period:	2010-2011
Technical specifications:	Nominal thermal capacity: 100 kW - 10 MW; fuel: short rotation coppice, agricultural residues (maize cobs; grass pellets)
Scope of work:	Simulation and support of the development of the biomass grate furnace with hot water or steam boiler

Conception of a newly erected biomass grate furnace in Oberhausen (North Rhine-Westphalia, Germany)

Customer:	POLYTECHNIK Luft- und Feuerungstechnik GmbH, AT
Project period:	2010
Technical specifications:	Nominal load: 12.4 MWth; fuels: woody biomass from forestry, plantations and landscape conservation as well as of screen overflow from composting with fuel moisture contents between M30 and M55
Scope of work:	CFD supported optimisation of a biomass grate furnace

Grate furnace designed for peat combustion for the company POLYTECHNIK Luft- und Feuerungstechnik GmbH, Weissenbach (Lower Austria, Austria)

Customer:	POLYTECHNIK Luft- und Feuerungstechnik GmbH, AT
Project period:	2010
Technical specifications:	Nominal thermal capacity (thermal oil boiler): 13 MW; fuel: peat
Scope of work:	CFD simulation and support of the design and optimisation of a grate furnace with thermal oil boiler

Biomass grate furnace type series of the company POLYTECHNIK Luft- und Feuerungstechnik GmbH, Weissenbach (Lower Austria, Austria)

Customer:	POLYTECHNIK Luft- und Feuerungstechnik GmbH, AT
Project period:	2009 - 2011
Technical specifications:	Nominal thermal capacity (hot water / steam / thermal oil boiler): 1 MW - 15 MW ; fuel: woody biomass fuels
Scope of work:	CFD simulation and support of the design and optimisation

Biomass grate furnace of the company VYNCKE ENERGIETECHNIEK N.V. (Harelbeke, Belgium)	
Customer:	VYNCKE ENERGIETECHNIEK N.V., BE
Project period:	2008-2009
Technical specifications:	Nominal thermal capacity (hot water boiler): 6 MW; fuel: woody biomass
Scope of work:	CFD simulation and support of the design and optimisation of the biomass grate furnace and fire tube boiler
Biomass grate furnace type series BIOTEC of the company Uniconfort srl., San Martino di Lupari (Italy)	
Customer:	Uniconfort srl, IT
Project period:	2008-2009
Technical specifications:	Nominal thermal capacity (hot water boiler): 350 kW - 5.8 MW; fuel: untreated woody biomass
Scope of work:	Simulation and support of the design and optimisation of the biomass grate furnace and fire tube boiler
Reduction of erosion tendencies of the lining of the cyclone evaporator of the biomass CFB furnace of the Strongoli power plant (Italy)	
Customer:	BIOMASSE ITALIA S.p.A., IT
Project period:	2008-2009
Scope of work:	CFD simulations with corrosion models to support the reduction of erosion tendencies in the biomass CFB furnace and water tube steam boiler including cyclone evaporator; fuel: woody biomass and agricultural residues
Mixed fuel furnace and boiler - Thermische Verwertungsanlage Schwarza (TVS) in Thuringia (Germany)	
Customer:	Oschatz GmbH, DE
Project period:	2006
Technical specifications:	Nominal fuel power: 31.0 MW; fuel: mixed fuel with paper residues (rejects) as well as waste from mechanical/biological waste treatment
Scope of work:	Simulation and support of the design of the grate furnace with water tube steam boiler
Biomass CHP plant based on an ORC cycle - TILLY HOLZINDUSTRIE G.m.b.H., Treibach/Althofen (Carinthia, Austria)	
Customer:	Tilly Holzindustrie Gesellschaft m.b.H., AT
Project period:	2005
Technical specifications:	Nominal thermal capacity: 10 MW (thermal oil boiler) + 1.5 MW (hot water economiser); nominal electric capacity (ORC process): 1.5 MW; fuel: untreated woody biomass fuels (wood waste and wood chips)
Scope of work:	CFD aided design of the biomass grate furnace with thermal oil boiler and hot water economiser
Biomass grate furnace with steam boiler in Frankenmarkt (Upper Austria, Austria)	
Customer:	Josef Bertsch GmbH & Co KG, AT
Project period:	2005
Technical specifications:	Nominal thermal load (hot water boiler): 9.95 MW; fuel: wood chips
Scope of work:	CFD simulation of furnace and radiative as well as convective part of the boiler with a heat exchanger model
Development of different biomass grate furnaces of the company POLYTECHNIK Luft- und Feuerungstechnik GmbH, Weissenbach (Lower Austria, Austria)	
Customer:	POLYTECHNIK Luft- und Feuerungstechnik GmbH, AT
Project period:	2004 - 2006
Scope of work:	Simulation and support of the design and optimisation of biomass grate furnaces with hot water / steam / thermal oil boiler in the medium and large size range; fuel: woody biomass fuels

Biomass furnace and boiler of the Kufstein CHP plant for Tiroler Wasserkraft AG, Innsbruck (Tyrol, Austria)

Customer:	Tiroler Wasserkraft AG, AT
Project period:	2002-2004
Technical specifications:	Nominal thermal capacity (steam boiler): 24.5 MW; nominal electric capacity (steam turbine): 6.5 MW; fuel: woody untreated biomass including bark
Scope of work:	CFD simulation and support of the design of the biomass grate furnace and water tube steam boiler

Biomass furnace and boiler for the CHP plant of LINZ STROM GmbH, Linz (Upper Austria, Austria)

Customer:	LINZ STROM GmbH, AT
Project period:	2002-2003
Technical specifications:	Nominal thermal capacity (steam boiler): 26.0 MW; nominal electric capacity (steam turbine): 7.0 MW; fuel: untreated woody biomass including bark
Scope of work:	CFD simulation and support of design of the biomass grate furnace and water tube steam boiler

Retrofit of the biomass under feed stoker combustion plant of TILLY HOLZINDUSTRIE G.m.b.H., Treibach/Althofen (Carinthia, Austria)

Customer:	Tilly Holzindustrie Gesellschaft m.b.H., AT
Project period:	2002
Technical specifications:	Nominal fuel power: 6.5 MW; fuel: untreated woody biomass fuels (wood waste)
Scope of work:	CFD aided retrofit of the biomass grate furnace and water tube steam boiler

Biomass furnace and boiler for the CHP plant Grossaitingen (Bavaria, Germany)

Customer:	Josef Bertsch Gesellschaft m.b.H. & Co, AT
Project period:	2001-2003
Technical specifications:	Nominal thermal capacity: 16.5 MW; nominal electric capacity steam turbine: 5.0 MW; fuel: waste wood
Scope of work:	CFD simulation and support of design of the biomass grate furnace and water tube steam boiler

Development of biomass gasifiers

Micro-scale CHP system based on fuel-flexible gasification and - SOFC - Horizon 2020-Project "FlexiFuel-SOFC"

Funding authority:	European Commission (Horizon 2020, GA No. 641229)
Project period:	2015-2019
Technical specifications:	6 kW el; fuels: various pellets and wood chips qualities, short rotation crops (poplar, willow) and agricultural residues
Scope of work:	CFD supported design of the biomass gasifier

Evaluation of ash related problems with a main focus on heavy metals during the combined gasification/combustion of waste wood in the Bio Power Plant Tyseley (Birmingham, UK)

Customer:	MWH Treatment Ltd, UK
Project period:	2017-2018
Technical specifications:	Four updraft gasifiers with a nominal gas power output of 10 MW each; joint steam boiler with a nominal boiler load of 40 MW; fuel: waste wood
Scope of work:	Performance of CFD simulations and high-temperature thermodynamic equilibrium calculations to evaluate the behaviour of heavy metals

High efficient and fuel flexible CHP technology based on a fixed-bed updraft gasifier and a SOFC - EU project "HiEff-BioPower"

Funding authority:	European Commission (Horizon 2020, GA No. 727330)
Project period:	2016-2020
Technical specifications:	Gasifier fuel power: 500 kW
Scope of work:	CFD-based development of the gasifier technology including assessment of tar degradation; CFD-based gasifier bed simulation; performance of high-temperature equilibrium calculations

Development of biomass pyrolysis plants

Technology for the combined generation of biochar, heat and electricity from biomass for the company POLYTECHNIK Luft- und Feuerungstechnik GmbH, Weissenbach (Lower Austria, Austria)

Customer:	POLYTECHNIK Luft- und Feuerungstechnik GmbH, AT
Project period:	2017-2019
Technical specifications:	Biochar production capacity: 3.000 t/a; nominal thermal power (hot water, steam, thermal oil): 1.3 MW
Scope of work:	Development of 3D CFD models for the transient simulation of pyrolysis reactors; CFD supported development and optimisation of the pyrolysis reactor and the pyrolysis gas burners; CFD supported optimisation of the drying unit

Low-emission pyrolysis oil combustion in gas turbines with University Twente and OPRA Turbines International BV (both The Netherlands)

Funding authority:	ERA-NET Bioenergy; Austrian Research Promotion Agency (FFG, Project number 857198), AT
Project period:	2017-2020
Scope of work:	CFD simulations of pyrolysis oil combustion in gas turbine fuel chambers

Torrefaction reactor technology for biogenic fuels of the company Andritz AG, Graz (Styria, Austria)

Funding authority:	Austrian Research Promotion Agency (FFG, Project number 836124, 842129), AT
Project period:	2013-2014
Scope of work:	CFD aided further development, optimisation and scale-up of a torrefaction reactor

Further applications

Heat recovery unit for a SOFC for the company AVL List GmbH, Graz (Styria, Austria)

Funding authority:	Austrian Research Promotion Agency (FFG, Project number 864851), AT
Project period:	2017 - 2021
Technical specifications:	5 kW(el)
Scope of work:	CFD supported development of a condensing heat exchanger applying special condensation and wall film models

Further development and optimisation of electrostatic precipitators for biomass combustion plants - Scheuch GmbH, AT

Customer:	Scheuch GmbH, AT
Project period:	2016-2017
Scope of work:	CFD simulation of test runs with ESP test rigs and validation of a new ESP models

Dust settling chamber (DSC) of an existing Waelz Kiln plant for TAIWAN STEEL UNION CO., LTD., Changhua County (Taiwan)

Customer:	TAIWAN STEEL UNION CO., LTD., TW
Project period:	2015-2016
Scope of work:	Analysis of the DSC regarding CO post-combustion; CFD based actual state analysis and stepwise optimisation

Evaluation of a thermal oil buffer storage of the company voestalpine Tubulars GmbH & Co KG, Kindberg (Styria, Austria)

Funding authority:	Austrian Research Promotion Agency (FFG, Project number 829862), AT
Project period:	2012-2013
Scope of work:	Transient CFD simulations of loading and unloading of a thermal oil buffer storage system

Biomass CHP plant based on a steam turbine process in Ramingdorf (Lower Austria, Austria)

Customer:	EVN Wärme GmbH
Project period:	2011-2012
Scope of work:	CFD simulation of the outer space circulation of an air cooler

Concept of a waste heat recovery from a rotary cement kiln of the company Wopfinger Baustoffindustrie GmbH, Waldegg (Lower Austria, Austria)

Customer:	Austrian Research Promotion Agency (FFG, Project number 825577), AT
Project period:	2009-2010
Technical specifications:	Fuel: lignite and refuse derived fuel (paper fibre residues, plastic waste, etc.); thermal capacity (recovered waste heat): 1.3 MW
Scope of work:	Simulation and support of the development of an optimised concept of a collector of a waste heat recovery unit of a rotary cement kiln

Biomass district heating plant St. Walburg im Ultental (South Tyrol, Italy)

Customer:	Internal project, AT
Project period:	2006-2007
Scope of work:	CFD analysis and optimisation of the space ventilation of the biomass CHP plant Kuppelwies (ORC space and boiler house)

RESEARCH AND DEVELOPMENT (R&D)

Fuel characterisation and fuel specific technology development

Promoting the penetration of agrobiomass heating in European rural areas (AgroBioHeat)

Funding authority:	European Commission (Horizon 2020, GA No.818369)
Project period:	01.01.2019-
Technical specifications:	Small and medium-scale boilers
Scope of work:	Testing of small and medium-scale biomass boilers regarding their performance when utilising agro-biomass. Development of guidelines for combustion technologies for agro-biomass

Novel and extended characterisation of wood pellets and combustion modelling (FuturePelletSpec)

Customer:	Technologie und Förderzentrum, Straubing, DE
Project period:	01.03.2019 - 28.02.2021
Technical specifications:	Pellet boilers and stoves
Scope of work:	Development of new characterization tools for wood pellets. Performance and evaluation of test runs

Developing the sustainable market of residential Mediterranean solid biofuels (BIOMASUD PLUS)

Funding authority:	European Commission (Horizon 2020, GA No. 691763)
Project period:	01.01.2016 - 31.12.2018
Scope of work:	Combustion related characterisation of Mediterranean biomass fuels and development of a corresponding database. Performance of combustion tests with Mediterranean biomass fuels at commercially available small-scale biomass boilers. Elaboration of proposals regarding the future standardization / certification of Mediterranean biomass fuels

Wood chip feeding technology of the future for small-scale biomass boilers (BioChip-Feeding)	
Funding authority:	European Commission (7th Framework Programme, GA No. 606464)
Project period:	1.10.2013 - 30.09.2015
Technical specifications:	< 500 kW th
Scope of work:	Development of a new fuel feeding system for wood chip boilers
Additive utilisation as a measure to improve combustion related properties of agricultural biomass fuels (AgroAdd-Brennstoffe)	
Funding authority:	Austrian Research Promotion Agency (FFG, Project number 838762), AT
Project period:	01.04.2013 - 31.03.2015
Scope of work:	Development of an additivation guideline for difficult agricultural biomass fuels. Through the targeted utilisation of additives, these fuels should be made suitable to be burned with low emissions in conventional, medium and large-scale biomass furnaces designed for wood fuels under economically advantageous framework conditions. Performance of test runs at a furnace with additivated agricultural fuels. Evaluation of possible additives and development of additivation strategies
Evaluation of a pellet stove operation with conventional and torrefied pellets - EU project "SECTOR"	
Funding authority:	European Commission (7th Framework Programme, GA No. 282826)
Project period:	01.01.2012 - 31.12.2013
Scope of work:	Combustion related characterization of pellets from torrefied biomass. Investigations regarding the utilisation of pellets from torrefied biomass in biomass boilers
Grate furnace designed for peat combustion for the company POLYTECHNIK Luft- und Feuerungstechnik GmbH, Weissenbach (Lower Austria, Austria)	
Customer:	POLYTECHNIK Luft- und Feuerungstechnik GmbH, AT
Project period:	2010
Technical specifications:	Nominal thermal capacity (thermal oil boiler): 13 MW; fuel: peat
Scope of work:	Performance of fuel analyses and combustion tests
Polygeneration of energy, fuels and fertilisers from biomass residues and sewage sludge (Enercom)	
Funding authority:	European Commission (7th Framework Programme, GA No. 218916)
Project period:	03.11.2008 - 30.11.2013
Scope of work:	Demonstration of highly efficient polygeneration of electricity, heat, solid fuels as well as high-value compost/ fertilisers from sewage sludge and greenery waste mixed to biomass residues
Investigation of the material flows and utilization of sewage sludge in Styria	
Customer:	Amt der Steiermärkischen Landesregierung, AT
Project period:	2006
Scope of work:	Investigation of mass flows and reasonable utilisation of and recycling of residues from sewage sludge in Styria
Technical and economic assessment of new sewage sludge gasification and sewage sludge incineration technologies	
Customer:	Gemeindebetriebe Frohnleiten, AT
Project period:	2004
Scope of work:	Technical and economic pre-evaluation of a new sewage sludge gasification technology as well as a new sewage sludge combustion technology
Assessment of the potential for the expected development of the pre-treatment of woody biomass	
Customer:	Komptech Farwick, Heissenberger & Pretzler GmbH, AT
Project period:	2002
Scope of work:	Characterisation of waste wood and development of a waste wood processing plant

Combustion tests with waste wood in a modern grate furnace

Customer:	Holzindustrie Preding GmbH, AT
Project period:	1997
Scope of work:	Performance and evaluation of combustion experiments with waste wood

Evaluation of glycerol phase co-combustion from RME/AME production in biomass combustion plants - SEEG Reg.Gen.m.b.H., AT

Customer:	SEEG Südsteirische Energie und Eiweisserzeugung Reg.Gen.m.b.H., AT
Project period:	1997
Scope of work:	Evaluation of the co-combustion of glycerine phases from RME and AME production in biomass furnaces and comparison with material utilisation possibilities

Development of biomass combustion plants and furnaces

Low-emission micro-scale pellet stove with innovative process control

Funding authority:	ERA-NET Bioenergy; Austrian Research Promotion Agency (FFG, Project number 869726), AT
Project period:	01.01.2019 -
Technical specifications:	4 kW pellet stove
Scope of work:	To make pellet stoves more competitive in the very low capacity range, the project aims at the development of an innovative, low-cost low-emission micro-scale (1 to 4 kW) pellet stove. Core elements of the new technology shall be a new pellet feeding system, a novel grate system, a CFD designed new combustion chamber with an improved insulation strategy and a control concept based on innovative sensors

Highly efficient low-emission wood-chip and pellet hybrid furnace technology for the company SL-Technik GmbH, St. Pantaleon (Upper Austria, Austria)

Customer:	SL-Technik GmbH, AT
Project period:	2018-
Technical specifications:	Power range: 20-500 kWth; fuels: wood chips, pellets
Scope of work:	Support in the development of a wood chip-pellet hybrid boiler technology with a new grate system including innovative fuel bed height control; Support in the development of a dry electrostatic precipitator; Execution of test runs on a test facility with different fuel qualities with accompanying emission measurements and analysis

Biomass combustion technology for agricultural biogenic residues for the company POLYTECHNIK Luft- und Feuerungstechnik GmbH, Weissenbach (Lower Austria, Austria)

Customer:	POLYTECHNIK Luft- und Feuerungstechnik GmbH, AT
Project period:	2016-2020
Technical specifications:	Capacity range: 1 to 30 MWth; for agricultural biomass fuels
Scope of work:	Grate combustion development for agricultural fuels; Implementation and evaluation of test runs on a test facility; Performance and evaluation of fuel and ash analysis; optimisation of the technology and of the process control

Clean and flexible use of new difficult biomass fuels in small to medium-scale combustion	
Funding authority:	ERA-NET Bioenergy Austrian Research Promotion Agency (FFG, project number 852050), AT
Project period:	01.01.2016 - 31.03.2019
Technical specifications:	< 10 MW
Scope of work:	The goal of the project is to enable the use of new “problematic” biomass fuels in small and medium-sized plants (<10 MW) at high efficiencies, low emissions and acceptable costs. This shall be achieved by the development of innovative fuel blending and additivation concepts as well as the further development of existing small and medium-scale combustion technologies. This involves laboratory reactor test runs with new difficult biomass fuels as well as the CFD-based development of fuel flexible technology concepts for fixed-bed combustion systems in the small (<500 kW) and medium-scale (up to 10 MW) as well as their subsequent test and stepwise optimisation and techno-economic analysis
Biomass combustion system of the future based on porous burners	
Funding authority:	Austrian Research Promotion Agency (FFG, Project number 852652, 858291), AT
Project period:	01.01.2016 - 31.12.2017
Scope of work:	Investigations regarding the applicability of foam ceramics in wood stoves and small-scale biomass furnaces as well as development of simulations routines for the simulation of application of foam ceramics in biomass furnaces
Optimisation of the PuroWIN combustion technology of the company Windhager Zentralheizung GmbH, Seekirchen (Salzburg, Österreich)	
Customer:	Windhager Zentralheizung GmbH, AT
Project period:	2016-2017
Technical specifications:	Nominal thermal capacity: 30 kW; fuel: wood chips
Scope of work:	Evaluation and optimization of the PuroWIN combustion technology based on test run results
Logwood fireplace insert of the company RIKA Innovative Ofentechnik GmbH, Micheldorf (Upper Austria, Austria)	
Customer:	RIKA Innovative Ofentechnik GmbH, AT
Project period:	2016-2017
Technical specifications:	Nominal power range: 5-12 kW; fuel: log wood
Scope of work:	Development of a new logwood fireplace insert technology with very low emissions
Fuel-flexible biomass boiler based on updraft gasification coupled with a gas burner	
Funding authority:	Austrian Research Promotion Agency (FFG, Project number 848841), AT
Project period:	2015-2017
Scope of work:	Development of a biomass boiler technology with extremely low emissions based on extreme air staging. Performance and evaluation of test runs at testing plants for technology optimisation
Fuel flexible, highly efficient and emission reduced biomass small-scale furnace technology based on a fixed bed updraft gasifier - Horizon 2020-Project "FlexiFuel-CHX"	
Funding authority:	European Commission (Horizon 2020. GA No. 654446)
Project period:	01.01.2016 - 31.12.2018
Technical specifications:	Power range: 20-100 kW; fuels: pellets, different wood chip qualities, short rotation crops (poplar, willow), miscanthus and agricultural residues (e.g. kernels, shells, agropellets)
Scope of work:	Development of a highly fuel-flexible and energy efficient small-scale biomass combustion technology based on a fixed-bed updraft gasifier connected with a gas burner, a boiler and a condensing heat exchanger

Development of next generation and clean wood stoves

Funding authority:	ERA-NET Bioenergy / KLIEN, KPC B466076
Project period:	01.08.2014 - 30.06.2017
Scope of work:	Development and optimisation of a new, next-generation log wood stove with automatic control. Investigations regarding the integration of high-temperature catalysts for emission reduction. Investigations regarding the integration of heat storage systems based on phase change material (PCM) to increase efficiency. Process control development

Optimisation of the log wood boiler LogWIN LWP 300 of the company Windhager, Seekirchen (Salzburg, Austria)

Customer:	Windhager Zentralheizung Technik GmbH, AT
Project period:	2014
Technical specifications:	Nominal thermal capacity: 30 kW; fuel: log wood
Scope of work:	Performance and evaluation of measurements on the log boiler LogWIN LWP 300, cooperation in the optimization of the technology

Development of a new wood chip furnace technology of the company Windhager Zentralheizung GmbH in the small to medium-scale power range, Seekirchen (Salzburg, Austria)

Customer:	Windhager Zentralheizung GmbH, AT
Project period:	2014-2015
Technical specifications:	Thermal power: 20-150 kW; fuel: wood chips
Scope of work:	Support in the design and optimization of a biomass fixed bed furnace with smoke tube boiler (hot water boiler), implementation and evaluation of test runs, optimisation of the technology

Low emission biomass grate furnace technology for fuels with very high moisture content for the company Josef BINDER Maschinenbau- und Handelsges.m.b.H., Bärnbach (Styria, Austria)

Customer:	Josef BINDER Maschinenbau- und Handelsges.m.b.H., AT
Project period:	2012-2014
Technical specifications:	Nominal thermal capacity: 1 MW
Scope of work:	Development of a new low emission biomass grate furnace technology for fuels with very high moisture content

Air heating system based on a pellet stove of the company RIKA Innovative Ofentechnik GmbH, Micheldorf (Upper Austria, Austria)

Customer:	RIKA Innovative Ofentechnik GmbH, AT
Project period:	2012-2013
Technical specifications:	Nominal thermal power: 10 kW; fuel: pellets
Scope of work:	Optimization of the gas-gas heat exchanger design; Testing, evaluation and optimization of the new technology

Low-dust and low-NOx-pellet biomass boilers based on an innovative air staging technology in combination with flue gas recirculation for the company KÖB Holzheizsysteme GmbH (Wohlfurth, Austria)

Customer:	KÖB Holzheizsysteme GmbH, AT
Project period:	2011-2013
Technical specifications:	Nominal thermal power: 12 kW
Scope of work:	Support in furnace and boiler development, evaluation and optimization of the technology

Latent heat storage concept based on a log wood stove for long-term heat storage of the company RIKA Innovative Ofentechnik GmbH, Micheldorf (Upper Austria, Austria)

Customer:	RIKA Innovative Ofentechnik GmbH, AT
Project period:	2011-2012
Technical specifications:	Nominal thermal load: 6-10 kW
Scope of work:	Support in the selection of suitable latent heat storage materials, development of a calculation model for latent heat storage, implementation and evaluation of test runs with accompanying comprehensive emission measurements as well as material and energy balance calculations

Pellet boiler with Ultra-Low emissions by primary measures for the company Windhager Zentralheizung GmbH, Seekirchen (Salzburg, Austria)

Customer:	Windhager Zentralheizung GmbH, AT
Project period:	2010-2012
Technical specifications:	Nominal thermal load: 15-70 kW
Scope of work:	Support in the development of a new combustion chamber for the pellet gasifier with improved cooling and multiple air staging, evaluation and optimisation of the technology based on test runs

Optimisation of the geometry and the control system of a stove of the company RIKA Innovative Ofentechnik GmbH, Micheldorf (Upper Austria, Austria)

Customer:	RIKA Innovative Ofentechnik GmbH, AT
Project period:	2009-2011
Technical specifications:	Fuel power: 7,7 kW; fuel: log wood
Scope of work:	Support with the development and tests on the developed low-emission stove, development of control system

Low-dust biomass small-scale furnace based on primary and secondary measures for the company Viessmann Werke GmbH & Co KG, Allendorf (Hesse, Germany)

Customer:	Viessmann Werke GmbH & Co KG, DE
Project period:	2009-2010
Technical specifications:	20 kW pellet boiler
Scope of work:	Development of a low-dust biomass small furnace, prototype development, performance and evaluation of test runs at a test plant, plant optimisation

Multifuel furnace of the company KWB Kraft & Wärme aus Biomasse GmbH, St. Margarethen/Raab (Styria, Austria)

Customer:	KWB Kraft & Wärme aus Biomasse GmbH, AT
Project period:	2007-2009
Technical specifications:	Nominal thermal capacity (hot water boiler): 8 to 120 kW; applicable for woody and herbaceous biomass fuels: e.g. wood chips, wood pellets, olive residues, Miscanthus etc.)
Scope of work:	Simulation and support of the development of a biomass grate furnace with fire tube boiler

Development of low-emission stoves of the company RIKA Innovative Ofentechnik GmbH, Micheldorf (Upper Austria, Austria)

Customer:	RIKA Innovative Ofentechnik GmbH, AT
Project period:	2010-2012
Scope of work:	Simulation and support of the design and optimisation of log wood fired low-emission stoves; optimization of the technology based on comprehensive test runs

Biomass combustion technology with extreme air staging of POLYTECHNIK Luft- und Feuerungstechnik GmbH, Weissenbach (Lower Austria, Austria)

Customer:	POLYTECHNIK Luft- und Feuerungstechnik GmbH, AT
Project period:	2012
Technical specifications:	Nominal fuel Capacity: 500 kW; fuel: wood chips
Scope of work:	Development of a wood chip-fired furnace based on extreme air staging, grate furnace with special post-combustion chamber. Nominal fuel capacity: 500 kW; fuel: wood chips

New low-NOx combustion in the medium output range for "new" biomass fuels

Customer:	Josef BINDER Maschinenbau- und Handelsges.m.b.H., AT
Project period:	2010-2011
Technical specifications:	Nominal thermal capacity: 100 kW - 10 MW; fuel: short rotation coppice, agricultural residues (maize cobs; grass pellets)
Scope of work:	Support of the development of a Low-NOx-combustion system for new biomass fuels in the medium capacity range. Performance and evaluation of test runs at a lab-scale reactor as well as at a testing plant

Grate furnace in combination with a single draft boiler and a flue gas quench for the company POLYTECHNIK Luft- und Feuerungstechnik GmbH, Weissenbach (Lower Austria, Austria)

Customer:	POLYTECHNIK Luft- und Feuerungstechnik GmbH, AT
Project period:	2010 - 2012
Technical specifications:	Nominal fuel capacity: 250 kW; fuel: wood chips
Scope of work:	Conception of a wood chip-fired grate furnace in combination with a single draft boiler; development of a flue gas quench / condenser system; performance and evaluation of test runs at testing plants for system optimisation

Development of a prototype of a new 100 kW pellet furnace of the company Fröling Heizkessel- und Behälterbau GmbH, Grieskirchen (Upper Austria, Austria)

Customer:	Fröling Heizkessel- und Behälterbau GmbH, AT
Project period:	2010
Technical specifications:	Nominal thermal capacity: 100 kW; fuel: wood pellets
Scope of work:	Performance and evaluation of test runs; process control development

Development of a new Low-NOx/Low-CO pellet gasification boiler technology with integrated fine PM emission reduction

Funding authority:	Austrian Research Promotion Agency (FFG, Project number 811095), AT
Project period:	2007 - 2009
Technical specifications:	< 50 kW th
Scope of work:	Support of the design and optimisation of the prototype of a new pellet furnace der Fa. Windhager Zentralheizung GmbH, Seekirchen (Salzburg, Austria). Performance of test runs at the prototype

Pellet and wood chip-fired furnace of KWB Kraft & Wärme aus Biomasse GmbH, St. Margarethen/Raab (Styria, Austria)

Customer:	KWB Kraft & Wärme aus Biomasse GmbH, AT
Project period:	2002-2003
Technical specifications:	Nominal thermal capacity: 150 kW biomass hot water boiler; fuels: wood chips and wood pellets
Scope of work:	Support of the design and optimisation of a prototype, support regarding process control development and performance of test runs at a prototype. Introduced into the market as KWB TDS Powerfire 150 boiler series, received the “Energie Genie 2004” award from the Austrian Ministry of the Environment in co-operation with the regional energy agency “O.Oe. Energiesparverband” as well as the “Energy Globe Award 2004” (special category “most innovative product”); Rotary grate furnace with a cyclone combustion chamber and fire tube boiler

Biomass furnace and boiler for the CHP plant Grossaitingen (Bavaria, Germany)

Customer:	Josef Bertsch Gesellschaft m.b.H. & Co, AT
Project period:	2001-2003
Technical specifications:	Nominal thermal capacity: 16.5 MW; nominal electric capacity steam turbine: 5.0 MW; fuel: waste wood
Scope of work:	Support of design of the biomass grate furnace and water tube steam boiler. Performance of test runs at the boiler

Development of biomass gasifiers

High efficient and fuel flexible CHP technology based on a fixed-bed updraft gasifier and a SOFC - EU project "HiEff-BioPower"

Funding authority:	European Commission (Horizon 2020, GA No. 727330)
Project period:	01.10.2016-
Technical specifications:	< 10 MW total output
Scope of work:	Development of a highly efficient medium-scale (up to 10 MW) biomass CHP system based on a fixed-bed updraft gasifier, a compact gas cleaning unit and a SOFC system

Micro-scale CHP system based on fuel-flexible gasification and a SOFC - Horizon 2020-Project "FlexiFuel-SOFC"

Funding authority:	European Commission (Horizon 2020, GA No. 641229)
Project period:	01.05.2015 - 30.06.2019
Technical specifications:	6 kW el; fuels: various pellets and wood chips qualities, short rotation crops (poplar, willow) and agricultural residues
Scope of work:	Development of a new fuel-flexible biomass mirco-CHP system based on a fixed-bed updraft gasifier, a gas cleaning unit and a fuel cell system (SOFC). Capacity range: up to 150 kW fuel power

Development of biomass pyrolysis plants

Biochar for Industry

Funding authority:	Austrian Research Promotion Agency (FFG, Project number 880776), AT
Project period:	01.01.2021 - 30.06.2023
Scope of work:	Optimisation of a pyrolysis process for the production of high-quality biochar for utilisation in the metallurgical industry. Development of a pyrolysis gas cleaning technology for subsequent pyrolysis gas utilisation in gas engines. Development and techno-economic evaluation of industrial application concepts

Enhanced catalytic fast pyrolysis of biomass for maximum production of high-quality biofuels /EnCat)

Funding authority:	Austrian Research Promotion Agency (FFG, Project number 857198), AT
Project period:	01.01.2017 - 31.08.2020
Scope of work:	Development of a novel concept based on fast pyrolysis for the production of high quality bio-oil at high yields. Development of a biomass pre-treatment process by leaching the feedstock with the light (water-rich) fraction of the pyrolysis oil in order to partially remove ash forming elements. Techno-economic analyses of the full-scale design of the new concept (from biomass feedstock to heat, electricity and biofuel)

Technology for the combined generation of biochar, heat and electricity from biomass for the company POLYTECHNIK Luft- und Feuerungstechnik GmbH, Weissenbach (Lower Austria, Austria)

Customer:	POLYTECHNIK Luft- und Feuerungstechnik GmbH, AT
Project period:	2017-2019
Technical specifications:	Feedstock: wood chips; biochar production capacity: 3.000 t/a; nominal thermal power: 1.3 MW
Scope of work:	Development of the overall concept; Development and optimization of the pyrolysis reactor and the pyrolysis gas burner; Implementation and evaluation of test runs on a test facility

Torrefaction reactor technology for biogenic fuels of the company Andritz AG, Graz (Styria, Austria)

Funding authority:	Austrian Research Promotion Agency (FFG, Project number 836124, 842129), AT
Project period:	2012
Scope of work:	CFD aided further development, optimisation and scale-up of a new torrefaction reactor technology for biogenic fuels, Implementation, evaluation and performance of test runs with gas measurements

Emission reduction

Further development and optimisation of electrostatic precipitators for biomass combustion plants - Scheuch GmbH, AT

Customer:	Scheuch GmbH, AT
Project period:	2016-2017
Scope of work:	Further development and optimisation of electrostatic precipitators for biomass combustion plants with a special focus on fuel and operation flexibility based on experimental work and CFD simulations

Use of electrostatic precipitators for small biomass firing systems

Customer:	Styrian provincial government, AT Environment Department of the City of Graz, AT
Project period:	2014
Scope of work:	Efficient reduction of fine particulate emissions from small-scale biomass heating systems by electrostatic precipitators - field tests, evaluations and accompanying research

Low-dust and low-NOx-pellet biomass boilers based on an innovative air staging technology in combination with flue gas recirculation for the company KÖB Holzheizsysteme GmbH (Wolfurt, Austria)

Customer:	KÖB Holzheizsysteme GmbH, AT
Project period:	2011-2013
Technical specifications:	Nominal thermal power: 12 kW
Scope of work:	Support in furnace and boiler development, evaluation and optimization of the technology

Low-NOx furnace for „new“ biomass fuels of the company Josef BINDER Maschinenbau- und Handelsges.m.b.H., Bärnbach (Styria, Austria)

Customer:	Josef BINDER Maschinenbau- und Handelsges.m.b.H., AT
Project period:	2010-2011
Technical specifications:	Nominal thermal capacity: 100 kW - 10 MW; fuel: short rotation coppice, agricultural residues (maize cobs; grass pellets)
Scope of work:	Performance of fuel analyses, lab-reactor test runs and test runs at a testing plant

Cost efficient biomass boiler systems with maximum annual efficiency and lowest emissions (BioMaxEff)

Customer:	European Commission (Framework Programme 7, Project No 286217)
Project period:	2011
Scope of work:	Performance of test runs as part of the demonstration of small biomass boilers with extremely low emissions and maximum efficiency

Biomass small-scale furnace technologies with Ultra-Low emissions - EU project "UltraLowDust"

Funding authority:	European Commission (Framework Programme 7, Project No 268189)
Project period:	2011
Technical specifications:	Power range: up to 100 kWth
Scope of work:	Development of Ultra-Low emission small-scale biomass combustion systems based on three novel technologies which cover the whole range of residential biomass heating applications

Evaluation of ESPs for old small biomass firing systems

Customer:	Austrian Research Promotion Agency(FFG, Project No 829868), AT
Project period:	2011
Scope of work:	Evaluation of the availability and efficiency as well as further development of ESPs for small-scale biomass combustion systems

Study regarding fine dust precipitators for small scale biomass firing systems

Customer:	Amt der Steiermärkischen Landesregierung, FA17c, AT
Project period:	2007
Scope of work:	Investigations regarding the availability, applicability and efficiency of fine particle precipitators for small-scale biomass combustion systems

Development of a Low-NOx combustion technology for MAWERA Holzfeuerungsanlagen GmbH (AT)

Customer:	MAWERA Holzfeuerungsanlagen GmbH (Hard, AT)
Project period:	1998 - 2001
Technical specifications:	440 kW
Scope of work:	Furnace development; performance of test runs at a testing plant to optimize the system settings for low-NOx operation

Process control development for biomass combustion systems

Model-based control strategy for a biomass grate furnace with hot water, thermal oil or steam boiler - POLYTECHNIK Luft- und Feuerungstechnik GmbH, AT

Customer:	POLYTECHNIK Luft- und Feuerungstechnik GmbH, AT
Project period:	2009 - 2011
Scope of work:	Implementation of a model-based control strategy for biomass grate furnaces with hot water, thermal oil or steam boiler

Low emission wood chip-fired furnace based on a model based control strategy

Customer:	Austrian Research Promotion Agency (FFG, Project No 834542), AT
Project period:	2012
Technical specifications:	Power range: ≤100 kW th; Fuel: wood chips
Scope of work:	Low emission wood chip-fired furnace based on a model based control strategy

Model based control system for medium-scale biomass combustion plants

Customer:	Research project in cooperation with BIOENERGY2020+ GmbH, AT
Project period:	2004
Scope of work:	Development of a model based control system for medium-scale biomass combustion plants

Development of new and innovative biomass combined heat and power technologies

Heat recovery unit for a SOFC for the company AVL List GmbH, Graz (Styria, Austria)

Funding authority:	Austrian Research Promotion Agency (FFG, Project number 864851), AT
Project period:	2017 - 2021
Technical specifications:	5 kW(el)
Scope of work:	Development of a 5 kWel SOFC CHP (Solid Oxide Fuel Cell Combined Heat and Power) system for residential and non-residential applications und special consideration of an efficient waste heat recovery

Development of innovative small(micro)-scale biomass-based CHP technologies

Funding authority:	ERA-NET Bioenergy; Austrian Research Promotion Agency (FFG, Project number 843799), AT
Project period:	01.05.2014 - 30.04.2017
Scope of work:	Further development of 3 different biomass small / micro CHP concepts based on thermoelectric generators, ORC and gas turbine processes. Development and optimization of a micro-CHP technology based on thermoelectric generators for pellet stoves. Techno-economic evaluation of all concepts investigated

Combination of solar thermal and biomass CHP with ORC technology (BIOconSOLAR)

Customer:	Austrian Research Promotion Agency (FFG, Project No 834427), AT
Project period:	2012
Scope of work:	- Development of a model for combined Solar-biomass CHP plant and techno-economic optimisation of the system incl. dynamic simulations - economic and ecological evaluation and determination of side constraints for an economic application - market analysis and evaluation of sustainability performance for the technology

Evaluation of the CraftEngine technology for biomass applications

Customer:	Viking Heat Engine AS, NO
Project period:	2012
Scope of work:	Technical and economic assessment (evaluation) of the CraftEngine technology for biomass applications

Innovative Small Scale Polygeneration System Combining Biomass And Natural Gas In A Micro Gas Turbine (BIO_MGT)

Customer:	European Commission (7th Framework Programme, GA Nr. 019675)
Project period:	2006
Technical specifications:	100 kW el
Scope of work:	Contributions to the development of the overall technology. Support in the development of a suitable biomass furnace and a high-temperature gas / gas heat exchanger. Performance and evaluation of test runs at a first demonstration plant

Investigation of the operation of a Pebble-Heater downstream of a biomass furnace - Siemens AG, DE

Customer:	Siemens AG, DE
Project period:	2001
Scope of work:	Investigation of the operation of a Pebble-Heaters downstream a biomass furnace with special respect to ash related problems

Small scale CHP-plant based on a hermetic four cylinder Stirling engine for biomass fuels (Bio-Stirling)

Customer:	European Commission (fifth framework)
Project period:	1999
Technical specifications:	70 kW el
Scope of work:	Furnace and process control technology development. Performance and evaluation of test runs at a first testing plant

Ash related problems in biomass combustion systems

Research into the influence of additives in waste wood gasification to reduce aerosol and deposit formation

Customer:	Austrian Research Promotion Agency (FFG, Project number 881783), AT
Project period:	2020-
Scope of work:	Evaluation of waste wood assortments with regard to the contents of contaminants and on the basis of chemical analysis. Evaluation of possible fuel additives to reduce the release of alkali metals and heavy metals from the fuel bed during gasification. Lab-scale test runs. Laboratory studies on the chlorination and sulphation behaviour of heavy metals

Evaluation of ash related problems with a main focus on heavy metals in the Bio Power Plant Tyseley (Birmingham, UK)

Customer:	MWH Treatment Ltd, UK
Project period:	2017-2018
Technical specifications:	Four updraft gasifiers with a nominal gas power output of 10 MW each; joint steam boiler with a nominal boiler load of 40 MW; fuel: waste wood
Scope of work:	Execution and evaluation of test runs; Fuel and ash analysis and their evaluation; Deposition measurements; High temperature equilibrium calculations

Efficient heat recovery from flue gas flows of biomass boilers by optimised material selection (Simple Heat)	
Funding authority:	Austrian Research Promotion Agency (FFG, Project number 848863), AT
Project period:	01.04.2015 - 30.05.2017
Technical specifications:	1 to 10 MW
Scope of work:	Long-term measurements with test heat exchangers and with a new low-temperature corrosion probe; Investigation of the corrosion mechanisms that occurred
Basic research on corrosion in biomass fired boilers	
Customer:	Austrian Research Promotion Agency (FFG, Project No 822749), AT
Project period:	2010
Scope of work:	Basic research on corrosion in biomass fired boilers
Investigation of the aerosol formation in the waste incineration plant of the community power plant Schweinfurt GmbH	
Customer:	Gemeinschaftskraftwerk Schweinfurt GmbH, DE
Project period:	2009
Scope of work:	Pyrometer and high-temperature impactor measurements at the MSW combustion plant of Gemeinschaftskraftwerk Schweinfurt GmbH
Development of a method for the production of a multi-nutrient fertiliser from sewage sludge ash	
Customer:	ASH DEC Umwelt AG, AT
Project period:	2005
Scope of work:	Development and detailed conception of a method and prototype for the production of a multi-nutrient fertiliser from sewage sludge ash