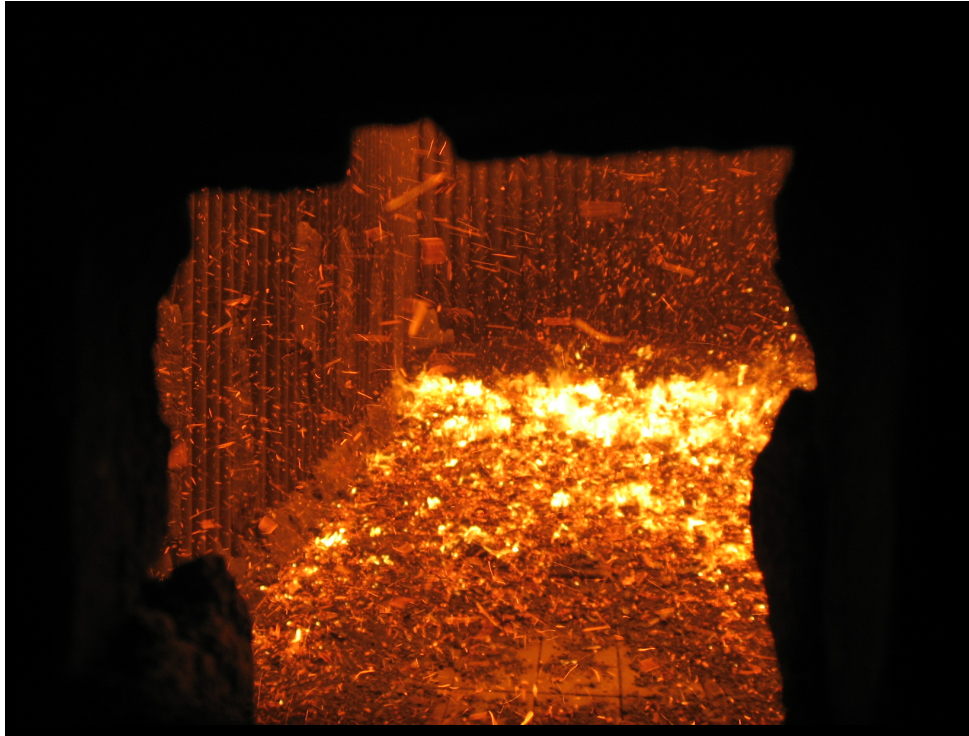


PROJECT CAPABILITIES



BIOMASS BOILER EVALUATIONS



Capacity, Operational Performance, Fuel Economy, and Emissions

Fuel economy, maximum availability, steam generating capacity, optimized emissions performance, and operating flexibility at the lowest cost are the key goals of biomass-fueled power boiler operation. JANSEN has conducted engineering evaluations for more than 250 biomass-fired boilers. We have assisted numerous mills with implementing operational and hardware changes to improve the performance and thermal efficiency, minimize fossil fuel co-firing, reduce landfill costs, and reduce air pollution emissions from their biomass boiler operations.

Scope of Services

- Waste fuels combustion problem solving (waste wood, bagasse, agro-waste, TDF, NCG, sludge, etc.).
- Improved performance and steam generating capacity from biomass.
- Application of advanced combustion technology.
- Reduced CO, VOC, NO_x, SO₂, and particulate emissions.
- Computational Fluid Dynamics (CFD) modeling and analysis (in-house).
- Measurement and analysis of boiler circulation.
- Incineration of concentrated and dilute non-condensable gases (CNCG & DNCG), and sludges.
- Boiler MACT Compliance Review and Implementation.

Selected References (see next page)

Selected References

Biomass Boiler Evaluations

Alabama River Pulp Company - Perdue Hill, AL
 Alliance Forest Products - Coosa Pines, AL
 Appleton Papers, Inc. - Roaring Spring, PA
 Atlantic Power Corporation - Williams Lake, BC
 Avista Corporation - Kettle Falls, WA
 Boise Building LLC - Medford, OR
 Boise Cascade Corporation - DeRidder, LA
 (2 units)
 Boise Cascade Corporation - Elgin, OR
 Boise Cascade Corporation - Steilacoom, WA
 Boise Cascade Corporation - Rumford, ME
 Boise Cascade Corporation - Int'l Falls, MN
 (2 units)
 Boise Cascade Corporation - Wallula, WA
 Bracell Ltd. - Lençóis Paulista, Brazil
 Bunge - Lehliu, Romania
 Burney Forest Products - Burney, CA
 CAIG, SA, Ing. Madre Tierra - Santa Lucia,
 COTZ, Guatemala
 Canadian Kraft Paper Industries - The Pas, MB
 Canfor Intercon - Prince George, BC
 Canfor Northwood - Prince George, BC
 Canfor PGP&P - Prince George, BC (2 units)
 Capital Power - Southport, VA
 Cariboo Pulp & Paper - Quesnel, BC
 Caracol Knits - San Pedro Sula, Honduras
 Cargill - Mairinque, Brazil
 Cargill - Minga Guazú, Paraguay
 Cargill - Ponta Grossa, Brazil
 Cargill - Primavera do Leste, Brazil
 Cargill - Três Lagoas, Brazil
 Cargill - Uberlândia, Brazil
 Carter Holt Harvey - Kawerau, New Zealand
 Carvajal - Cali, Colombia (2 units)
 Catalyst-Hudson - Anderson, CA
 Catalyst Paper - Crofton, BC
 Catalyst Paper - Port Alberni, BC
 Catalyst Paper - Powell River, BC
 Clearwater Paper - Lewiston, ID
 Consolidated Papers, Inc. - Wisconsin Rapids, WI
 Corn Products International - Winston-Salem, NC
 (2 units)
 Corner Brook Pulp & Paper - Corner Brook, NL
 Daishowa America - Port Angeles, WA
 Daishowa Marubeni - Peace River, AB
 Delta Natural Kraft - Pine Bluff, AR
 Dominion Virginia Power - Altavista, VA (2 units)
 Dominion Virginia Power - Hopewell, VA (2 units)
 Dominion Virginia Power - Hurt, VA (3 units)
 Dominion Virginia Power - Southampton, VA
 Domtar Corporation - Ashdown, AR (3 units)
 Domtar Corporation - Espanola, ON
 Domtar Corporation - Kingsport, TN
 Domtar Corporation - Nekoosa, WI
 Domtar Corporation - Plymouth, NC (2 units)
 Domtar Corporation - Windsor, QC
 DTE Energy - Cassville, WI
 DTE Energy - Stockton, CA
 Eurocan Pulp & Paper Company - Kitimat, BC
 Evergreen Packaging - Canton, NC
 Evergreen Packaging - Pine Bluff, AR
 FibroMinn - Benson, MN
 Finch Paper LLC - Glens Falls, NY
 Flambeau Paper - Park Falls, WI
 Fletcher Challenge - Crofton, BC
 FMC Corporation - Green River, WY
 Fortistar Biomass - Hillman, MI
 Fraser Papers, Inc. - Park Falls, WI
 Fraser Papers, Inc. - Plaster Rock, NB
 Georgia-Pacific Corporation - Camas, WA
 Georgia-Pacific Corporation - Cedar Springs, GA
 Georgia-Pacific Corporation - Crossett, AR
 Georgia-Pacific Corporation - Naheola, AL
 (2 units)
 Georgia-Pacific Corporation - Palatka, FL
 Georgia-Pacific Corporation - Pennington, AL
 Georgia-Pacific Corporation - Perry, FL
 Georgia-Pacific Wood Products - Corrigan, TX
 Georgia-Pacific Wood Products - Diboll, TX
 Georgia-Pacific Wood Products - Dudley, NC
 Georgia-Pacific Wood Products - Gurdon, AR
 Georgia-Pacific Wood Products - Pineland, TX
 Georgia-Pacific Wood Products - Prosperity, SC
 Great River Energy - Spiritwood, ND
 Grupo Cassa - Izalco, El Salvador
 Hercules Pinova - Brunswick, GA
 Idaho Forest Group - Moyie Springs, ID
 Incauca S.A.S. - Cali, Colombia (2 units)
 Inland Paperboard and Packaging - Rome, GA
 International Paper Company - Augusta, GA
 (2 units)
 International Paper Company - Bastrop, LA
 International Paper Company - Bogalusa, LA
 (2 units)
 International Paper Company - Corrigan, TX
 International Paper Company - Courtland, AL
 International Paper Company - Eastover, SC
 International Paper Company - Franklin, VA
 International Paper Company - Georgetown, GA
 (2 units)
 International Paper Company - Luíz Antônio,
 SP, Brazil (2 units)
 International Paper Company - Mansfield, LA
 (2 units)
 International Paper Company - Mogi Guaçu,
 SP, Brazil
 International Paper Company - Orange, TX
 International Paper Company - Pensacola, FL
 International Paper Company - Pine Bluff, AR
 International Paper Company - Pine Hill, AL
 International Paper Company - Pineville, LA
 International Paper Company - Port Wentworth, GA
 International Paper Company - Prattville, AL
 International Paper Company - Riegelwood, NC
 International Paper Company - Saillat, France

Selected References

Biomass Boiler Evaluations (cont'd)

International Paper Company - Selma, AL
 International Paper Company - Terre Haute, IN
 International Paper Company - Ticonderoga, NY
 International Paper Company - Vicksburg, MS
 KapStone Papers - Charleston, SC
 KapStone Papers - Roanoke Rapids, NC
 Ketchikan Pulp Company - Ketchikan, AK
 Kimberly-Clark Corporation - Everett, WA
 Kimberly-Clark Corporation - Loudon, TN
 Koch Cellulose - Brunswick, GA
 L'Anse Warden Electric - L'Anse, MI
 Longview Fibre - Longview, WA
 Louisiana-Pacific - Chetwynd, BC
 Louisiana-Pacific - Roaring River, NC (2 units)
 MacMillan Bloedel Ltd. - Port Alberni, BC
 MasTec Power Corporation - Franklin and
 Madison, GA
 Mead Paper - Chillicothe, OH
 Mead Paper - Escanaba, MI
 Mead Paper - Stevenson, AL
 MeadWestvaco Corporation - Covington, VA
 MeadWestvaco Corporation - Luke, MD
 MeadWestvaco Corporation - Phenix City, AL
 (2 units)
 Minnesota Power - Duluth, MN (2 units)
 Minnesota Power - Grand Rapids, MN (2 units)
 Mondi SCP - Ružomberok, Slovakia
 Multitrade - Rabun Gap, GA
 ND Paper - Rumford, ME
 Neucel Specialty Cellulose - Port Alice, BC
 NewPage Corporation - Escanaba, MI (2 units)
 NewPage Corporation - Wickliffe, KY
 NewPage Corporation - Wisconsin Rapids, WI
 NewPage Corporation-Biron - Wisconsin Rapids,
 WI
 Northern Pulp - New Glasgow, NS
 Orange County Container Group - Forney, TX
 Ohio Edison Company - Akron, OH
 Packaging Corporation of America - Counce, TN
 Packaging Corporation of America - Valdosta, GA
 (2 units)
 Packaging Corporation of America - Tomahawk,
 WI
 Plum Creek - Columbia Falls, MT (2 units)
 Port Townsend Paper - Port Townsend, WA
 Portucel - Cacia, Portugal
 Primary Power - Flint, MI
 PurEnergy - Rabun Gap, GA
 ReEnergy Holdings - Kenansville, NC
 ReEnergy Holdings - Lyonsdale, NY
 Resolute Forest Products - Saint-Félicien, QC
 Riverwood International - Macon, GA
 Riverwood International - West Monroe, LA
 RockTenn Company - Demopolis, AL (2 units)
 RockTenn Company - Panama City, FL (2 units)
 RockTenn Company - Stevenson, AL
 Roseburg Forest Products - Dillard, OR
 Roseburg Forest Products - Weed, CA
 Sappi North America - Cloquet, MN
 Sappi North America - Skowhegan, ME (2 units)
 Sappi North America - Muskegon, MI
 Simpson Paper Company - Gilman, VT
 Simpson Tacoma Kraft - Tacoma, WA
 Smurfit-Stone Container Corporation -
 Fernandina Beach, FL
 Smurfit-Stone Container Corporation - Florence, SC
 Smurfit-Stone Container Corporation - Hodge, LA
 Smurfit-Stone Container Corporation - Missoula, MT
 Smurfit-Stone Container Corporation - Stevenson, AL
 Smurfit-Stone Container Corporation - West Point, VA
 SP Newsprint - Newberg, OR
 Spruce Falls, Inc. - Kapuskasing, ON
 Stone Container (Canada) Inc. - Portage du Fort, QC
 Stora Enso North America - Biron, WI
 Suzano Papel e Celulose - Suzano, Brazil
 Tembec Inc. - Chetwynd, BC
 Temple-Inland - Bogalusa, LA (2 units)
 Thilmany Papers - Kaukauna, WI
 Tolko Manitoba - The Pas, MB
 Twin Rivers Paper - Edmundston, NB
 Verso Paper - Sartell, MN
 West Fraser / Weldwood - Hinton, AB
 WestRock - Phenix City, AL
 WestRock - Tacoma, WA
 Westvaco - Evadale, TX
 Weyerhaeuser Company - Columbus, MS
 Weyerhaeuser Company - Cosmopolis, WA
 Weyerhaeuser Company - Emerson, AR
 Weyerhaeuser Company - Everett, WA
 Weyerhaeuser Company - Kamloops, BC
 Weyerhaeuser Company - Longview, WA
 Weyerhaeuser Company - New Bern, NC
 Weyerhaeuser Company - Oglethorpe, GA
 Weyerhaeuser Company - Plymouth, NC
 Weyerhaeuser Company - Port Wentworth, GA
 Weyerhaeuser Company - Rothschild, WI
 Weyerhaeuser Company - Springfield, OR
 Weyerhaeuser Company - Valliant, OK
 Wheelabrator - Auburndale, FL
 Wheelabrator-Spokane - Spokane, WA
 Willamette Industries - Bennettsville, SC
 Willamette Industries - Campti, LA
 Willamette Industries - Hawesville, KY
 Xcel Energy - Ashland, WI