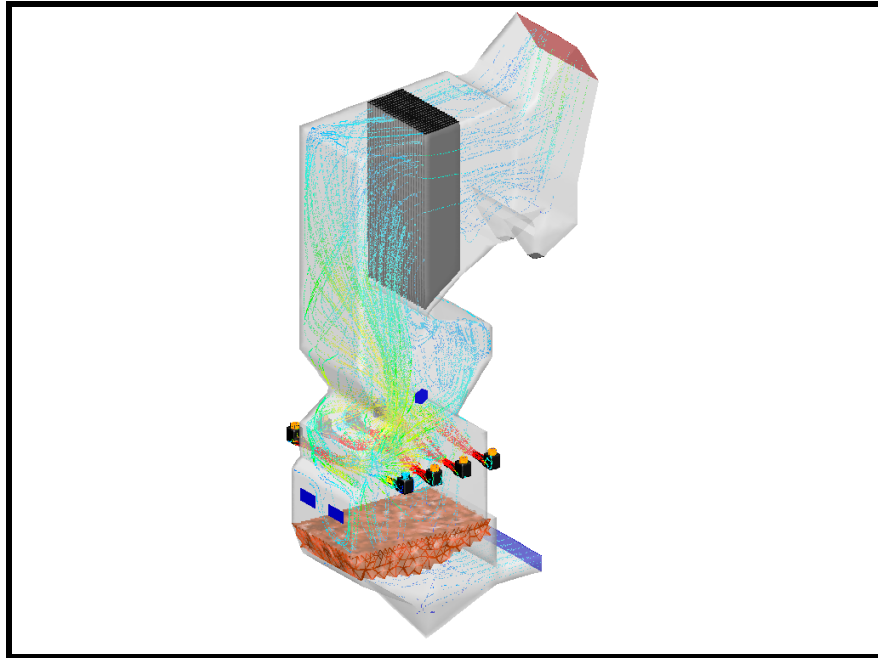


## PROJECT CAPABILITIES

### COMPUTATIONAL FLUID DYNAMICS (CFD) MODELING

- **Chemical Recovery Boilers**
- **Biomass Boilers**
- **Waste-to-Energy Boilers (MSW & RDF)**



JANSEN uses Computational Fluid Dynamics (CFD) modeling software to analyze fluid flow patterns, fuel combustion processes, fuel capacity, emissions performance, and heat transfer profiles in various boiler-related equipment. The scope of services typically includes boiler data collection, set-up of a model to evaluate current performance, and the use of this model to evaluate conceptual improvements. CFD modeling by JANSEN is conducted in-house by JANSEN engineers.

#### **Applications**

Typical areas where JANSEN applies CFD modeling to predict, evaluate, and/or optimize performance of boiler equipment include:

- Modifications to the combustion air delivery system.
- Evaluation of temperature and oxygen distribution in combustion furnaces.
- Optimization of the liquor distribution in recovery boilers.
- Heat transfer analysis in superheaters, generating banks, and economizers.
- Analysis of flow pattern and particulate distribution in inlet ducting to precipitators.
- Evaluation of combustion conditions in waste fuel- and fossil fuel-fired boilers.
- Evaluation of boiler emissions performance (TRS, CO, VOC, SO<sub>2</sub>, NO<sub>x</sub>, particulates).
- Spray cooler, scrubber, and cascade/cyclone evaporator performance predictions.
- Evaluation of DNCG and CNCG incineration.

#### **Selected References (see next page)**

## Selected References - CFD Modeling

Alabama River Pulp Company - Perdue Hill, AL  
 Appleton Papers - Roaring Spring, PA  
 APRIL Group - Rizhao, China  
 AssiDomän Sepap - Štefí, Czech Republic  
 Atlantic Power Corp. - Williams Lake, BC  
 Bahia Specialty Cellulose S.A. - Camaçari, BA, Brazil  
 Boise Cascade Corp. - Int'l Falls, MN (2 units)  
 Boise - DeRidder, LA (2 units)  
 Boise - Wallula, WA  
 Bukocel - Hencovce, Slovakia  
 CAIG, S.A., Ingenio Madre Tierra Santa Lucia, COTZ, - Guatemala (2 units)  
 Capital Power - Southport, VA  
 Cargill - Três Lagoas, Brazil  
 Carvajal - Cali, Colombia (3 units)  
 Clearwater Paper - Lewiston, ID  
 Clearwater Paper - McGehee, AR  
 Confidential Customer - Canada  
 Corn Products International - Winston-Salem, NC (2 units)  
 Covanta Energy - Hartford, CT  
 Covanta Energy - Niagara Falls, NY  
 Daishowa America - Pt. Angeles, WA  
 Daishowa Marubeni - Peace River, AB  
 Dominion Virginia Power - Altavista, VA  
 Dominion Virginia Power - Hopewell, VA  
 Dominion Virginia Power - Hurt, VA  
 Domtar Industries - Ashdown, AR (2 units)  
 Domtar Inc. - Nekoosa, WI  
 Domtar Inc. - Rothschild, WI (2 units)  
 Domtar Inc. - Windsor, PQ  
 Domtar Papers - Cornwall, ON  
 DTE Energy - Cassville, WI  
 DTE Energy - Stockton, CA  
 Eurocan Pulp & Paper - Kitimat, BC  
 Evergreen Packaging - Canton, NC  
 FMC Corporation - Green River, WY  
 Georgia-Pacific Corporation - Brunswick, GA  
 Georgia-Pacific Corporation - Camas, WA (2 units)  
 Georgia-Pacific Corporation - Clatskanie, OR  
 Georgia-Pacific Corporation - Crossett, AR  
 Georgia-Pacific Corporation - Diboll, TX  
 Georgia-Pacific Corporation - Monticello, MS  
 Georgia-Pacific Corporation - New Augusta, MS  
 Georgia-Pacific Corporation - Old Town, ME  
 Georgia-Pacific Corporation - Palatka, FL (2 units)  
 Georgia-Pacific Corporation - Pineland, TX  
 Georgia-Pacific Corporation - Prosperity, SC  
 Georgia-Pacific Corporation - Port Hudson, LA  
 Glatfelter - Chillicothe, OH  
 Graphic Packaging International - West Monroe, LA  
 Great River Energy - Elk River, MN  
 Harmac Pacific Inc. - Nanaimo, BC  
 Hitachi Zosen Inova - Norcross, GA  
 Incauca S.A.S. - Cali, Colombia  
 Inland Paperboard and Packaging - Orange, TX  
 International Paper Company - Augusta, GA (2 units)  
 International Paper Company - Bastrop, LA  
 International Paper Company - Bogalusa, LA (2 units)  
 International Paper Company - Cantonment, FL  
 International Paper Company - Corrigan, TX  
 International Paper Company - Courtland, AL  
 International Paper Company - Franklin, VA  
 International Paper Company - Georgetown, SC (2 units)  
 International Paper Company - Jay, ME  
 International Paper Company - Mansfield, LA (2 units)  
 International Paper Company - Mogi Guaçu, S.P., Brazil  
 International Paper Company - Orange, TX  
 International Paper Company - Pine Bluff, AR  
 International Paper Company - Pineville, LA  
 International Paper Company - Prattville, AL  
 International Paper Company - Saillat, France  
 International Paper Company - Luiz Antônio, S.P., Brazil (2 units)  
 International Paper Company - Selma, AL  
 International Paper Company - Texarkana, TX  
 International Paper Company - Ticonderoga, NY  
 International Paper Company - Vicksburg, MS  
 KapStone Papers - Charleston, SC  
 Ketchikan Pulp Company - Ketchikan, AK  
 Kimberly-Clark Corporation - Everett, WA  
 Koch Cellulose - Brunswick, GA (2 units)  
 Kruger-Wayagamack, Inc. - Trois Rivières, QC  
 Longview Fibre - Longview, WA (2 units)  
 Louisiana-Pacific - Chetwynd, BC  
 Louisiana-Pacific - Roaring River, NC  
 Maine Energy - Biddeford, ME  
 Mead Paper - Chillicothe, OH  
 Mead Paper - Escanaba, MI  
 Mead Paper - Stevenson, AL  
 MeadWestvaco - Covington, VA (2 units)  
 MeadWestvaco - Phenix City, AL (3 units)  
 Minnesota Power - Duluth, MN (2 units)  
 Mondi Group - Ružomberok, Slovakia  
 Neucel Specialty Cellulose - Port Alice, BC (2 units)  
 NewPage Corporation - Escanaba, MI (3 units)  
 NewPage Corporation - Wickliffe, KY (2 units)  
 Packaging Corporation of America - Counce, TN  
 Packaging Corporation of America - Tomahawk, WI  
 Packaging Corporation of America - Valdosta, GA (2 units)  
 Plum Creek - Columbia Falls, MT (2 units)  
 Process Equipment/Barron Industries - Pelham, AL  
 Rayonier, Inc. - Jesup, GA (3 units)  
 ReEnergy Holdings - Lyonsdale, NY  
 Riverside Forest Products - Armstrong, BC  
 RockTenn Company - Demopolis, AL (2 units)  
 RockTenn Company - Fernandina Beach, FL (2 units)  
 SAPPI North America - Cloquet, MN  
 SAPPI North America - Muskegon, MI (2 units)  
 SAPPI North America - Skowhegan, ME (3 units)  
 Simpson Tacoma Kraft Co. - Tacoma, WA (2 units)  
 Smurfit-Stone - Brewton, AL (2 units)  
 Smurfit-Stone - Hodge, LA  
 Smurfit-Stone - Missoula, MT  
 Smurfit-Stone - Stevenson, AL  
 Smurfit-Stone - West Point, VA  
 SP Newsprint - Newberg, OR  
 Stora Enso North America - Biron, WI  
 Tembec - Chetwynd, BC  
 Thilmany Paper - Kaukauna, WI  
 Veolia Dade County - Miami, FL  
 Veolia Waste-to-Energy - Burnaby, BC  
 Visy Pulp and Paper - Tumut, Australia  
 Von Roll America Inc. - East Liverpool, OH  
 WestRock - Fernandina Beach, FL  
 Westvaco Corporation - Silsbee, TX  
 Westvaco Corporation - Wickliffe, KY  
 Weyerhaeuser Canada Ltd. - Prince Albert, SK  
 Weyerhaeuser Company - Columbus, MS  
 Weyerhaeuser Company - Kamloops, BC  
 Weyerhaeuser Company - Longview, WA  
 Weyerhaeuser Company - Springfield, OR  
 Weyerhaeuser Company - Valliant, OK  
 Wheelabrator Energy - Auburndale, FL  
 Wheelabrator Energy - Baltimore, MD  
 Wheelabrator Energy - Portsmouth, VA  
 Wheelabrator Inc. - Spokane, WA  
 Willamette Industries - Bennettsville, SC  
 Willamette Industries - Campti, LA  
 Xcel Energy - Ashland, WI