

# Recent Coal to Natural Gas Fuel Conversion Experience Designs and Studies



## STUDIES

Client-Facility	Size	Boiler Type	Scope	Date
Confidential – 2 unitBits	730 MW each	Corner-fired (twin furnace boiler)	Prepared a natural gas conversion study, which included BOP activities and cost estimate. Also included expected boiler performance (i.e., boiler efficiency, flue and air gas flow rates, auxiliary power, fuel flow rate, etc.), flue gas recirculation (FGR) system, main natural gas piping, FD/ID fan assessment, natural gas P&IDs per NFPA 85, I&C modifications, and electrical upgrades/modifications.	2015
Confidential – 2 units	275 MW 573 MW	Corner-fired (twin furnace boiler)	Prepared a natural gas conversion study, which included BOP activities and cost estimate. Also included expected boiler performance (i.e., boiler efficiency, flue and air gas flow rates, auxiliary power, fuel flow rate, etc.), flue gas recirculation (FGR) system, main natural gas piping, FD/ID fan assessment, natural gas P&IDs per NFPA 85, I&C modifications, and electrical upgrades/modifications.	2014
Confidential	2x650 MW	Wall-fired	Prepared a feasibility/BOP igniter natural gas conversion study. Detailed BOP work included main natural gas piping, natural gas P&IDs per NFPA 85, I&C modifications, and electrical upgrades/modifications.	2013-2015
Seminole Electric Cooperative, Inc.	680 MW each	FW wall-fired	Implementation phase: Conversion of existing oil system to natural gas ignition. Also, natural gas cofiring capability was studied for each unit. Includes detailed design of new, common natural gas pipeline and individual unit upgrades for new natural gas igniters, gas control and pressure reduction skids, and modified burner management system (BMS) controls.	2013-2015
Confidential	2x450 MW	Corner-fired	Prepared a BOP natural gas conversion study and a review of the boiler OEM feasibility study and costs. Detailed BOP work included main natural gas piping, natural gas P&IDs per NFPA 85, I&C modifications, and electrical upgrades/modifications.	2013
Confidential	570 MW	Corner-fired	Prepared a BOP natural gas conversion study and a review of the boiler OEM feasibility study and costs. Detailed BOP work included main natural gas piping, natural gas P&IDs per NFPA 85, I&C modifications, and electrical upgrades/modifications.	2013
Confidential	705 MW and 745 MW	Wall-fired	Prepared a BOP natural gas conversion study and a review of the boiler OEM feasibility study and costs. Detailed BOP work included main natural gas piping, natural gas P&IDs per NFPA 85, I&C modifications, and electrical upgrades/modifications.	2013
Confidential	105 MW and 120 MW	Cyclone	Prepared a BOP natural gas conversion study and a review of the boiler OEM feasibility study and costs. Detailed BOP work included main natural gas piping, natural gas P&IDs per NFPA 85, I&C modifications, and electrical upgrades/modifications.	2013

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PacifiCorp Naughton 3	350 MW	Corner-fired	Prepared a BOP natural gas conversion study and a review of the boiler OEM feasibility study and costs. Detailed BOP work included main natural gas piping, natural gas P&IDs per NFPA 85, I&C modifications, and electrical upgrades/modifications. An EPC specification was developed for the conversion to 100% natural gas firing.	2013
Confidential	350 MW	Corner-fired	Prepared a BOP natural gas conversion study. Detailed BOP work included main natural gas piping, natural gas P&IDs per NFPA 85, I&C modifications, and electrical upgrades/modifications.	2013
Confidential	2x880 MW	Corner-fired	Prepared a natural gas conversion study and provided cost estimates for boiler modifications. The study included expected boiler performance (i.e., boiler efficiency, flue and air gas flow rates, auxiliary power, fuel flow rate, etc.).	2011
Confidential	3x150 MW	Wall-fired	Prepared a natural gas conversion study and provided cost estimates for boiler modifications. The study included expected boiler performance (i.e., boiler efficiency, flue and air gas flow rates, auxiliary power, fuel flow rate, etc.). Options to meet BART requirements were reviewed, including advanced low-NO <sub>x</sub> burners and OFA, neural network, and SNCR technology applications. This study also included a detailed review of environmental permitting requirements.	2011
Duke Gallagher 1-4	4x150 MW	Wall-fired	Prepared natural gas conversion study and provided cost estimates for boiler modifications. The study included expected boiler performance (i.e. boiler efficiency, flue and air gas flow rates, auxiliary power, fuel flow rate, etc.). S&L prepared a review and cost estimates for options of cofiring with PRB and natural gas. A boiler feasibility study was performed by boiler OEM on two of the four boilers and was reviewed by S&L. Bid specifications were developed for two units, which included a boiler reinforcement specification and bid evaluation, natural gas low-NO <sub>x</sub> burner and FGR specification and bid evaluation, and GWC specification and bid evaluation.	2009-2011
Confidential	2x600 MW	Cyclone	Prepared a natural gas conversion white paper and provided cost estimates for boiler modifications.	2010
Confidential	175 MW and 290 MW	Cyclone	Prepared a natural gas conversion white paper and provided cost estimates for boiler modifications.	2010
Confidential	715 MW	Wall-fired	Prepared a natural gas conversion white paper and provided cost estimates for boiler modifications.	2010

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Confidential	640 MW	Wall-fired	Prepared a natural gas conversion white paper and provided cost estimates for boiler modifications.	2010
Confidential	500 MW	Cyclone	Prepared a natural gas conversion study and provided cost estimates for boiler modifications. The study included expected boiler performance (i.e., boiler efficiency, flue and air gas flow rates, auxiliary power, fuel flow rate, etc.).	2010
Confidential	550 MW	Wall-fired	Prepared a natural gas conversion study and provided cost estimates for boiler modifications and FGR conceptual design was performed.	2010
Confidential	2x140 MW	Wall-fired	Prepared a natural gas conversion study and provided cost estimates for boiler modifications. The study included expected boiler performance (i.e., boiler efficiency, flue and air gas flow rates, auxiliary power, fuel flow rate, etc.). A high-level boiler feasibility study was performed by the boiler OEM and reviewed by S&L.	2010
Confidential	2x900 MW	Wall-fired	Prepared a natural gas conversion study and provided cost estimates for boiler modifications. A boiler feasibility study was performed by the boiler OEM and reviewed by S&L.	2010
Confidential	210 MW and 340 MW	Cyclone and corner-fired	Prepared a review and study for natural gas conversion from a coal-fired boiler. The study included expected boiler performance (i.e., boiler efficiency, flue and air gas flow rates auxiliary power, fuel flow rate, etc.). Also prepared a review and cost estimates for options of co-firing with PRB and natural gas.	2009