# CASE STUDY

**Rev 022819-1**

**Can you retrofit your boiler with ULNB equipment while providing a ROI in 2 to 4 years. Interested? Please keep reading….**

## SITUATION

There are many considerations driving the decision to retrofit a boiler with new combustion equipment. There are AQMD rules requiring Ultra Low NOx Burner (ULNB) equipment, maintenance issues surrounding older technology, and simply just trying to improve the safety, reliability, performance, efficiency, etc.

All of these actions have with them an associated cost. But what if you could retrofit with Ultra Low NOx technology, while also producing a payback in 2 to 4 years, with continued savings over the entire life of the equipment. The below case study will illustrate the conditions when this is possible while demonstrating supporting calculations;

## CONDITIONS

If you are currently operating a boiler with high excess air, a premix type burner, or high amounts of Flue Gas Recirculation (FGR) then this retrofit might be applicable to you and should be seriously considered.

Example, say you have a 400 HP boiler that operates for 6,000 hours per year and annually consumes 96,000 million Btu's of natural gas while producing up to 13,800 lb/hour of 150-psig steam.

If you are operating a high excess air premix type burner would suggest an air level of 54% with a flue gas temperature of 400°F. From DOE table DOE/GO-102012-3405, the boiler combustion efficiency is 77.2% (E1).

Replacing the burner with a low excess air ***WEBSTER SC Series Ultra Low NOx*** can result in an excess air level of about 22.5% with a flue gas temperature of 380°F. The boiler combustion efficiency increases to about 83.1% (E2). Assuming a fuel cost of $5.00/MMBtu, *the annual savings are*:

= Fuel Consumption x (1–E1/E2) x Fuel Cost
= 96,000 MMBtu/yr x ( 1-77.2/83.1) x $ 5.00/MMBtu
= **$34,079 dollars per year**

This savings combined with the elimination of Combustion Head replacement at $15,000 dollars ($5000/yr ave), plus elimination of labor and inlet air filter maintenance at $4,500 dollars per year.

## RESULTS

**Turnkey retrofit cost divided by the cost savings produce a payback in less than 4 years!**

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