

Washington, D.C. March 18, 2010

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# Sustainable Liquid Fuels Getting It Done Meeting

**Thermotechnology**

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**BOSCH**

# Introduction

- Buderus is a distributor of hot water heating equipment for residential and commercial applications
- Buderus formed in 1731 and has been an innovator of new heating technologies since 1825
- Buderus North America is headquartered in Londonderry, New Hampshire with training facilities and distribution on site
- Part of the Bosch Thermotechnology family of brands and products
- Long standing guiding principles: energy efficiency, resource conservation, environmental protection, and safety
- Large network of business partners to meet the growing demand for the company's products throughout North America



# History of Innovation

Buderus was one of the first to offer the following oil boiler related products:

- A full three pass boiler for the residential and commercial markets
- Shock proof boilers
- Blue flame technology
- Residential condensing oil technology
- Commercial condensing oil boiler with low sulfur oil



## Product Samples



G/GB125BE residential with indirect DHW tank



G615 Commercial with Riello Burners  
Application: a New England High School

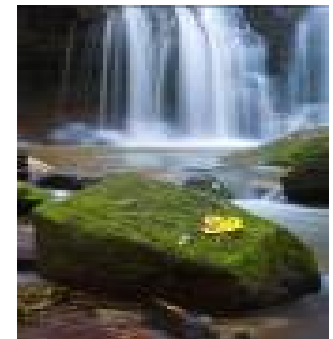
## Today

- Low sulfur oil in Germany since 2007
- Move to 50 ppm sulfur oil in Germany in 2 years. Europe in 5 years.
- Government tax incentives and policy to aid transition
- Rapid growth of Buderus oil boilers sold in 2009 for condensing, low sulfur fuel
- Our products developed to meet the 15 ppm standard



## Benefits

- Higher efficiencies through condensing units, 90%+ AFUEs
- Boiler has lower fuel deposits, means much easier to clean
- Clean boiler for a much longer period maximizes efficiency
- Greater equipment reliability and longevity
- Cleaner emissions due to low sulfur content
- Easier handling of condensate due to ultra low level of sulfur
- More liquid fuel equipment options for consumers
- Consumer acceptance of the equipment technology shift
- Buderus experience to date is successful operation of equipment with no special adjustments for low sulfur heating oil



## Buderus Advantage – Blue Flame Burner

- Clean boiler advantage also due to blue flame technology
- Blue flame “reburns” combustion products, burns w/ pre-mixed flame
- Contrast to regular burners with a diffusion flame which is an inherent cause of soot formation
- Sulfur reduction will help but is not the ultimate answer
- Low sulfur is needed in order to utilize condensing oil boilers; avoidance of sulfuric acid in flue products



Low NO<sub>x</sub>  
Buderus Burner



Conventional  
Burner

**Buderus**

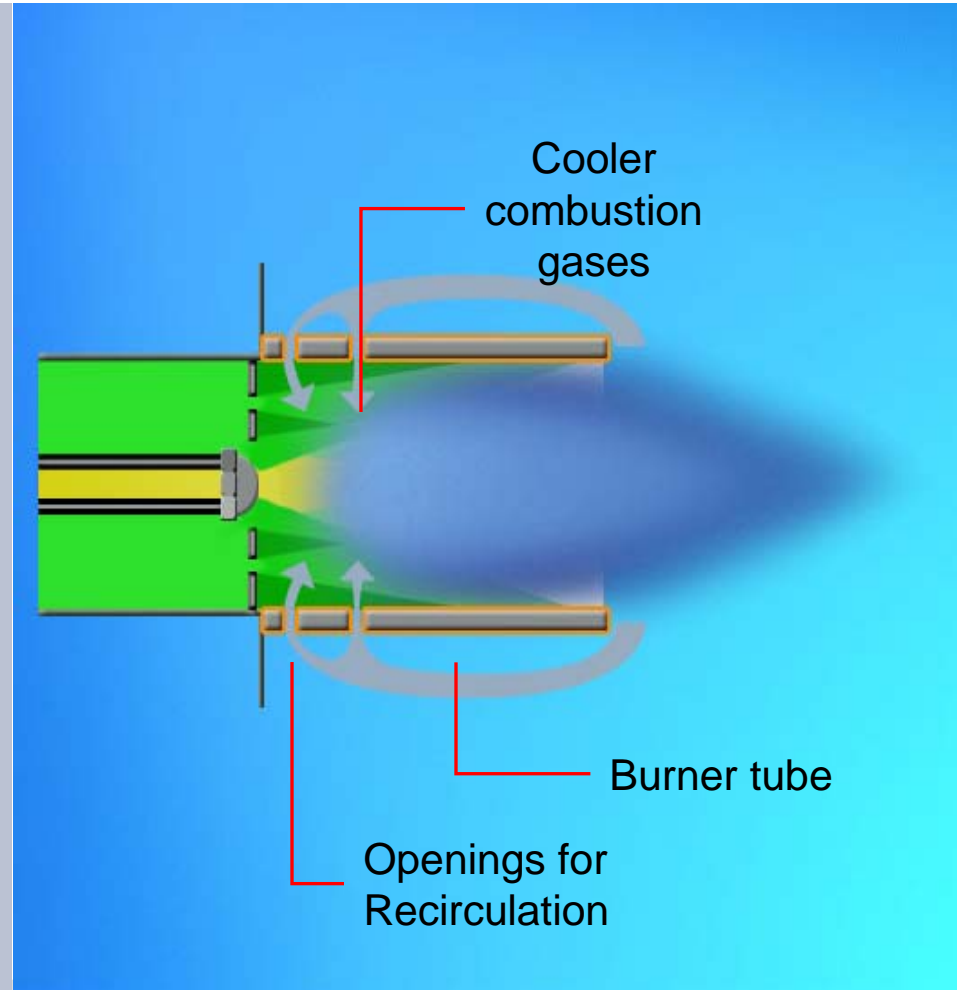
**G/GB125BE**

**Low NO<sub>x</sub> Burner**



# Secondary Recirculation and Pollutant Reduction

- Burner tube has openings for secondary recirculation
- Secondary recirculation cools the flame
- Cool flame significantly reduces  $\text{NO}_x$  (Nitrogen Oxide) emissions
- Soot accumulation significantly increases the exhaust temperature, which is energy lost for heating!
- Complete evaporation of the fuel prevents soot generation
- Heat transfer to boiler water remains at a high level



**Lower Flame Temp = Lower NOx Value**

## Buderus – Available today

- Condensing “regular” oil boiler for homes: GB125
- Full use of 15 ppm ultra low sulfur oil
- B5 Biofuel compatible across sulfur range



GB125BE: 91% + AFUE Full Condensing Oil Burner

## Buderus – Available today

- Dual fuel commercial boiler: SB Series
  - Condensing gas
  - Oil as emergency backup with low sulfur oil (<900 ppm)
  - Condensing oil continuous operation with ultra low sulfur oil



SB735 with 4000 Series Controller  
up to 98% efficient

# Future

- Condensing boilers across full range of residential and commercial sizes
  - Can have full condensing boilers with AFUEs > 90%
  - Allows for modulation thus giving boilers high efficiency
- Modulating burner development to be determined for market, size and longevity?
- Low sulfur oil is a potential opportunity for equipment suppliers
- Wall mounted low sulfur oil boilers in production and on sale in Europe now

# Future potential...

### → Green products

- Systems: “wall” boiler and solar hot water
- Fuel fired heat pumps for hybrid performance and even higher efficiencies
- Biomass
- CHP

→ With our history of innovation, Buderus will be there

# Alternative Energy Products from Bosch Today



Florida Heat Pump unit

G201 Wood  
Boiler



Buderus SKS Solar Panels

## Things to Consider

- Biofuels
  - “Green “
  - Can be home grown
  - Concept can also be construed as CO2 neutral
  - Local jobs
  
- Opportunity with automotive industry given their flex-fuel and ethanol engines?

	2007	2010
→ Managing price difference in transition	Premium of 50 ppm Sulfur Oil to 1000 ppm Heating Oil 6 cents / liter	1 cent / liter
1/1/09 Tax of 1.5 cents per liter on 1000 ppm Oil		

- Marketing story
  
- Systems: Solar Domestic Hot Water and Heating with a Boiler

# Solar Domestic Hot Water Home



# The Kenney Family, New Brunswick, Canada



*Who are these people?*

# Independence from fossil fuels

- Kenney Family of six to live without oil and gas in the Eco Plus Home for 1 year
- Utilize Bosch Electric heat pump, household appliances, solar thermal and photovoltaic technology to guarantee a positive energy balance
- Follow their experiences and energy usage at [www.ecoplushome.com](http://www.ecoplushome.com)
- The solar thermal system will generate heat and hot water
- The heat pump uses geothermal energy
- The heat pump needs electricity to run, the photovoltaic system will generate more CO<sub>2</sub>-free electricity during the year than the heat pump will consume
- Excess electricity will be fed into the public grid and withdrawn when needed
- CO<sub>2</sub> emissions from the Eco Plus Home will be close to zero, whereas a conventional home produces an average of eight tons of CO<sub>2</sub> per year

# European Products

For natural heating with logs and pellets:  
Solid fuel boiler, fireplace inserts and blueline stoves

NOT available  
in North America



Oil fired Logano plus  
SB105 compact boiler  
standing against the  
wall (11 to 27 kW)

Floorstanding oil fired  
condensing boilers  
Logano plus GB125\*  
(18 to 35 kW)

NOT available  
in North America



Special pellet boiler  
Logano SP251 (15 to 25 kW)

Solid fuel boiler  
Logano S151  
(15 to 40 kW)



Fireplace insert  
KA146 P  
(8 kW)



blueline stove  
No. 10  
(8 kW)