

NOx Control Technology

Joe Cassmassi

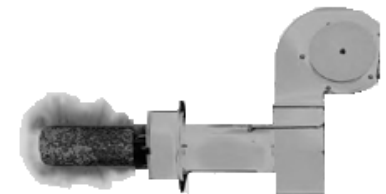
Planning & Rules Director

Evolving Technology Development

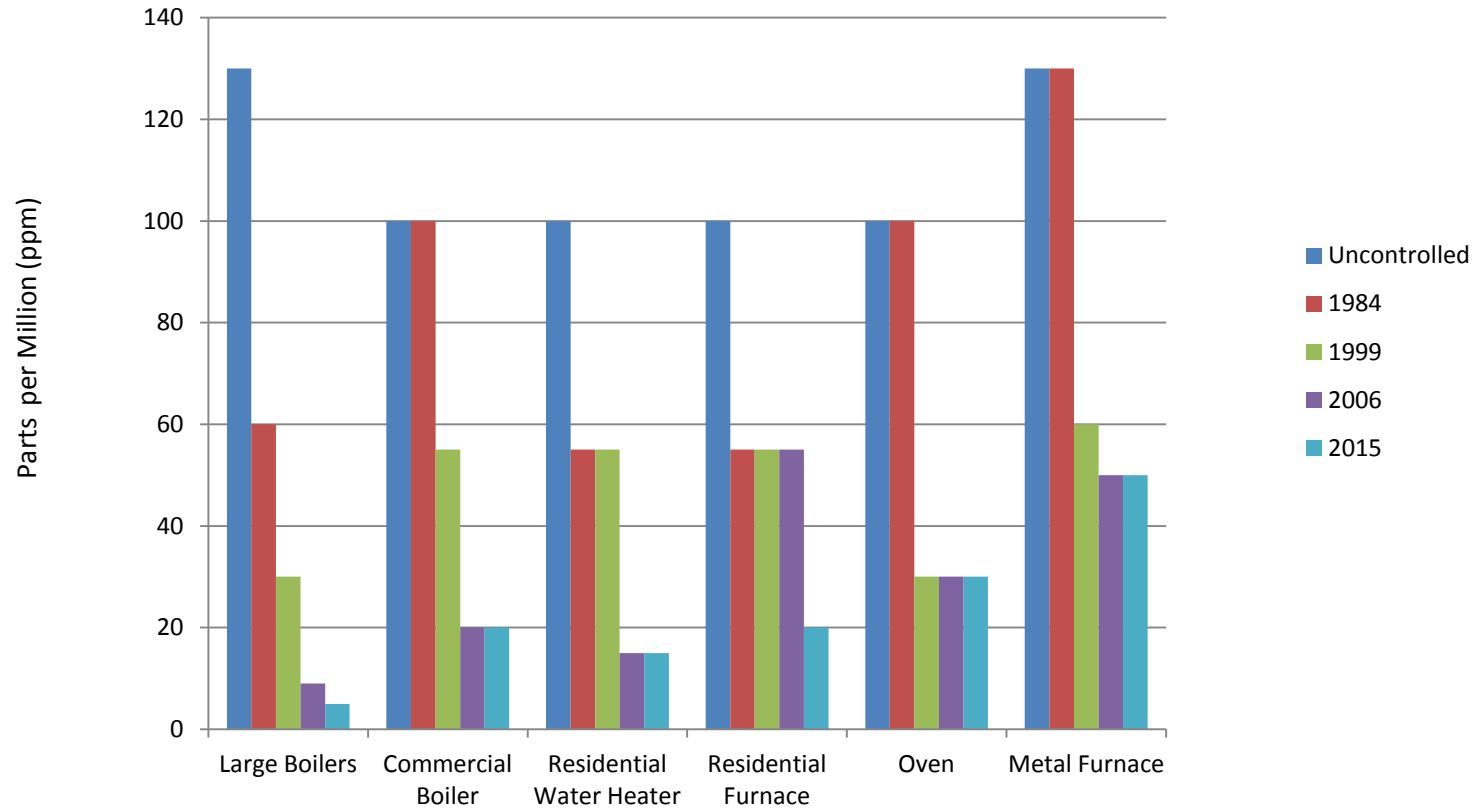
- Control technology to meet specific applications
 - Small equipment
 - Ultra low NOx burners
 - Biogas applications
 - Gas clean-up/catalyst/SCR
 - Non selective catalytic reduction
 - Large Facilities - RECLAIM

Boiler, Furnace and Oven NOx

- Rules:
 - 1121 – Residential Tank Water Heaters
 - 1111 – Residential Heating Furnaces
 - 1146/1146.1 – Boilers and Process Heaters
 - 1146.2 – Commercial Boilers and Water Heaters
 - 1147 – Ovens, Furnaces, Kilns, etc.



History of NOx Limits for New Equipment



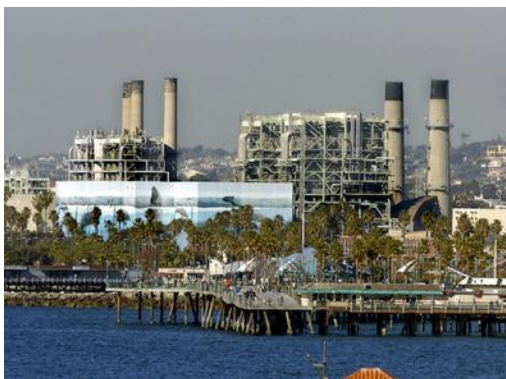
“opportunities for incentives to replace legacy equipment”

Biogas Applications

- Large IC engine combustion associated with landfills and digester operation
- Key concern: contaminants in gas flow
 - Gas clean-up coupled with post combustion VOC catalyst & SCR
 - NOXTECH – non selective catalytic reduction without gas clean-up
 - Hydrogen enhancement to biogas

NO_x RECLAIM

- SCAQMD's REgional Clean Air Incentives Market program is designed to achieve programmatic NO_x emission reductions equivalent to command-and-control, while giving operators flexibility to sell or buy NO_x credits in the market for facility operations



NOx RECLAIM

- NOx reduction control technology for RECLAIM
 - SCR
 - Low-NOx Burners
 - Ultra Low-NOx Burners
 - Newer Burners (Flameless, Duplex technology, Electrodynamic Combustion Control)
 - Wet Gas Scrubbers (LoTOx, KnowNOx)
 - Cheng Low NOx
 - Ultra Cat Ceramic Filtration

