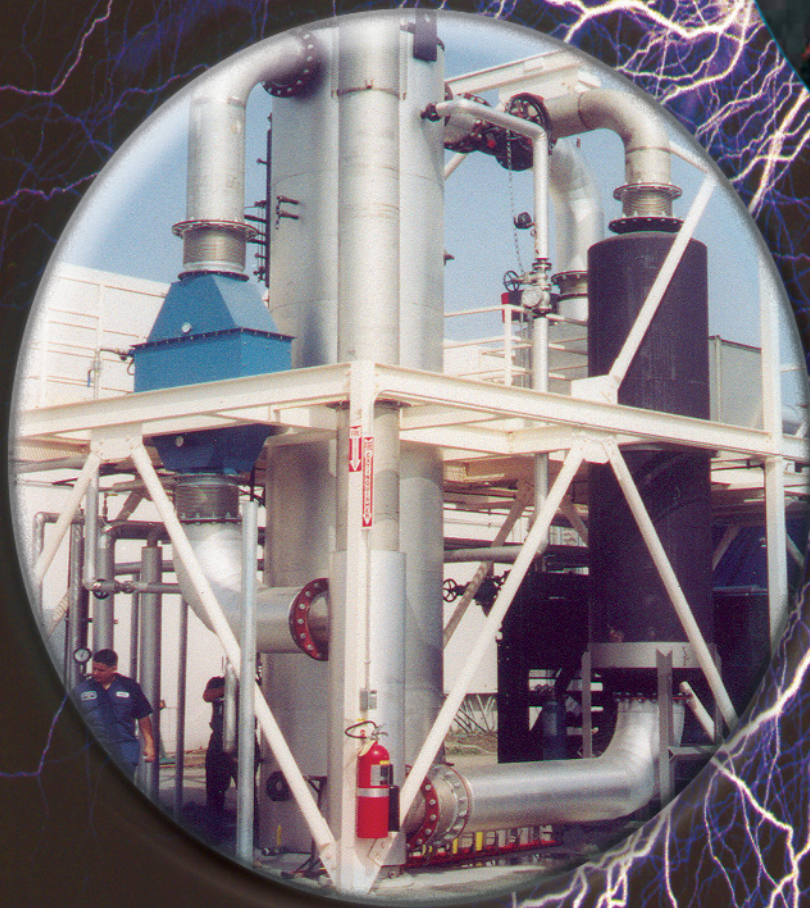
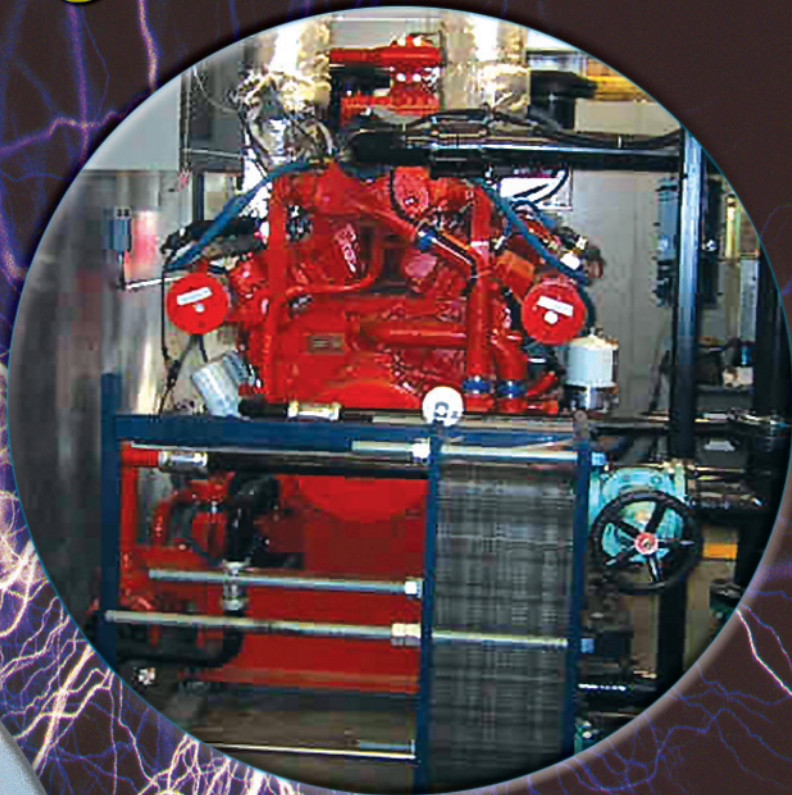


# Clean, Efficient And Affordable Cogeneration



**CSM Worldwide**



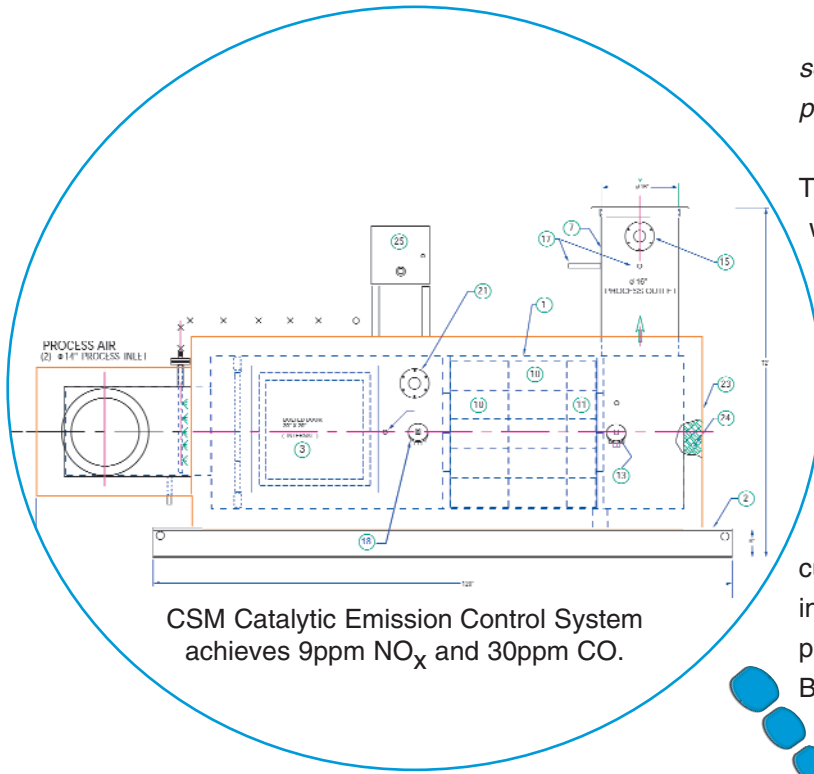
solution” to the complex problem of emission control and air permit compliance with the necessity of waste heat recovery.

This versatile COGEN System Solution smoothly integrates with the prime mover of choice to complete the COGEN Distributed Generation Power Project.

## Project Management Assures Success

Multimillion dollar projects are typical for CSM's staff of Project Engineers. Some of the largest corporations in the world are found among CSM's list of satisfied customers. Recently completed projects for CSM customers include systems for Sunoco, Chevron, and DuPont; previous projects include systems for Kodak, Kraft, George Weston Bakeries, Keebler and Sara Lee.

From Concept to Completion, CSM Project Management brings together the key elements that define a successful project. Commencing with an intensely detailed project “kick-off meeting”



CSM Catalytic Emission Control System achieves 9ppm NO<sub>x</sub> and 30ppm CO.

**CSM Worldwide, Inc.** is a full service supplier of clean, efficient and affordable COGEN Systems for industry. Providing equipment and services from coast-to-coast, CSM provides total project management and complete design and manufacturing services for COGEN Projects that are both environmentally-sound and energy efficient.

## CSM Is Unique

CSM is unique because it is also an expert in emission control systems for power generation equipment. For decades, CSM has been providing total project management and complete design and manufacturing services for air pollution control projects for NO<sub>x</sub>, CO, VOC and PM abatement. Catalytic Systems expertise includes the use of custom designed SCR Systems for NO<sub>x</sub> reduction from the exhaust of stationary engines and turbines.

Experts in high efficiency heat recovery, over 90% of all CSM systems currently operate using CSM provided waste heat recovery!

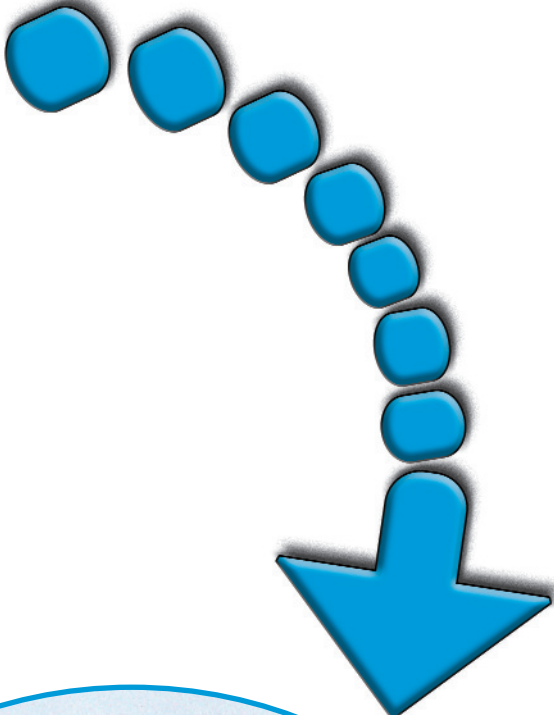
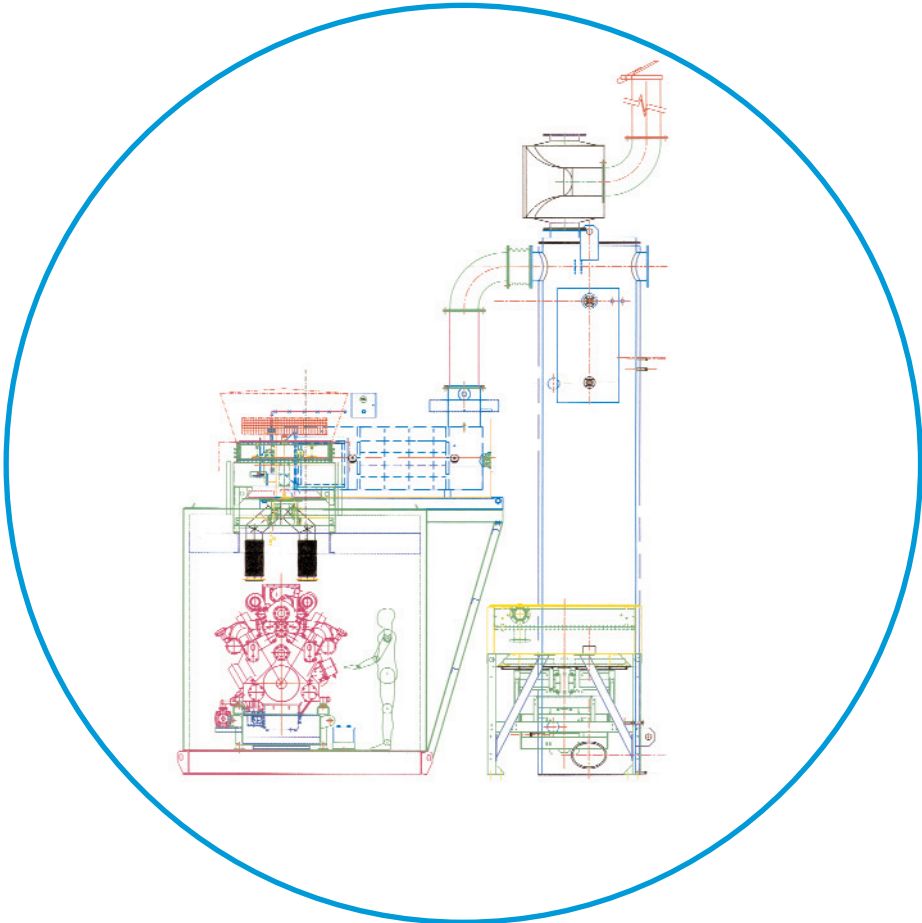
CSM's custom line of KALEX™ heat exchangers are considered by customers as the “gold-standard” of compact, efficient and affordable energy recovery from clean, hot air exhaust. Routinely, *CSM integrates heat recovery into the Catalytic Emission Control System; providing a “seamless*



involving all of the companies, consultants and contributors to the project; all aspects of equipment and system design, selection, purchase, manufacture and installation are established. Project assignments are made and a firm schedule for project completion is established. Equally critical, the project budget is set!

Concept to Completion

1 MW Cogen facility now operating in California. Heat recovery is integrated seamlessly with the Catalytic Emission Control System.



**Strategic Alliances Strengthen The Team**

The critical elements for a successful project must include a group of highly capable, experienced and well respected individuals and corporations who know how to complete power projects and do so routinely! CSM has surrounded itself with just such companies, and together with established strategic alliances, these companies form the members of a “Championship Team”. Recent projects on both coasts demonstrate the team’s success.

Highlighting such success are two recent COGEN Projects in California. Both projects were initiated by CSM's strategic alliance partner, COGENTECH. The team brings a total corporate commitment to Strategic Combined Heat and Power (CHP) Solutions that are clean, efficient, reliable and proven. Heat reclaimed from engine jacket water is used to provide heated hot water for the facility. An economizer is also used to pre-heat boiled feed water.





## CHP in SCAQMD, Northern California

This COGEN Distributed Generation Plant is designed to employing two (2) lean burn Guascor 360 GLD natural gas fired engines to generate a total of 1 MW of power. Uniquely designed as a "Tri-Generation" plant, to generate electric power,

### Customers benefit by using CSM to design, implement and manage their COGEN Systems Project because CSM:

- Provides a Completely Engineered, Total Solution
- Custom Designs Each COGEN Solution Using the Latest Technology
- Systems are in Compliance with the Most Stringent Emission Control Standards
- COGEN Solutions provide for Clean, Efficient and Affordable Power
- Provides the Highest Quality and Reliability
- Provides Easy Maintenance and Nationwide Service Availability
- Specializes in Seamless Solutions for Emission Control and Heat Recovery
- Offers an Experienced Staff of Project Engineers and Managers
- Provides Best Performance from a Trouble Free System That is Built to Last
- Commits its 105 years of Experience, In-house Engineering Staff and Established Network of Strategic Partners to Your Successful Project!

heat hot water and make steam; the current configuration include one (1) such engine with plans to install the second engine in the near future.

Environmental compliance in this tough California district is met by use of a custom designed and manufactured Catalytic Emission Control System, which uses SCR and oxidation catalysts to achieve ultra low emissions of NOx (less than 9 ppm corrected to 15% O<sub>2</sub>) and CO (less than 30 ppm corrected to 15% O<sub>2</sub>).

CSM's "Dual Engine Real Time Ammonia Control System" was deployed in this installation to assure compliance to these rigid emission control standards without compromising on the flexibility of power plant operability.

The CSM supplied emission control system married smoothly with the Guascor engine and seamlessly with the HRSG.

Heat reclaimed from engine jacket water is used to provide heated hot water for the facility. An economizer is also used to pre-heat boiler feed water.

## CHP in SCAQMD, Southern California

This CHP COGEN facility provides electrical and steam power for this consumer product manufacturer at their plant in Southern California. Located within the South Coast Air Quality Management District (SCAQMD), this installation meets the very strict air emission compliance requirements of BACT (Best Available Control Technology) that were applicable to the project.

CSM's "Real Time Ammonia Control System", which uses a NOx analyzer in a closed loop control configuration to regulate the injection of ammonia into the NOx laden engine exhaust, was used at this facility.

Using a lean burn Guascor 560 GLD natural gas fired engine to generate about 1 MW of power, the plant also employs a Vapor Phase HRSG to generate steam.

Once again, heat was reclaimed from engine jacket water.



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