




P.E.M.S.



A photograph of an industrial facility, likely a refinery or chemical plant, featuring several tall, cylindrical towers and smokestacks. The sky is blue with some light clouds. The image is used as a background for the text.

Environmental regulations worldwide require emissions monitoring systems in order to acquire timely concentrations of emission levels. Instead of expensive samplings and analysis of gases at the stack, PEMS continuously calculate the compositions of exhaust gas based on feed compositions, process parameters and ambient conditions. PEMS use an empirical model to predict emission concentrations based on realtime process data. PEMS can provide an alternative way of acquiring continuous emissions values in process units where Continuous Emission Monitoring Systems (CEMS) are not present.

PEMS are virtual instruments with additional functionalities such as:

- ✓ Automatic sensors validation;
- ✓ Historical emission levels reconstruction;
- ✓ Identification of key process variables;
- ✓ Enhancement of advanced process control strategies.

Current regulations is based on periodic tests at the stack and continuous emission monitoring systems (CEMS) in order to verify compliance with legal limits.

CEMS cannot correlate process status to emission levels, in order to anticipate corrective actions before legal violations occur. European Governments are planning more stringent legislation to regulate the levels of emissions. The European Agencies are in an early stage of developing new criteria for model-based emission monitoring systems, while in the U.S.A., model based virtual instruments are accepted as an alternative monitoring systems. The emissions trading schemes, and their financial implications, imply the need for improved emissions monitoring as an essential part of Environmental management system (EMS).



PEMS advantage

PEMS utilize modeling techniques based on the “first principles approach”, “data driven system identification”, “Hybrid modeling”. Site-specific data, are acquired during PEMS start-up. Data acquired in the validation phase, using temporarily installed emissions monitoring systems, are used for tuning of model parameters.

Research targets

Successful implementations of PEMS are largely dependent from models availability and model-implemented tools. Hardware and software packages need to implement functionalities for data acquisition, data processing, model testing. Although the main players on the market claim the availability of proprietary hardware and software systems, there is, viceversa, a need for model research and development in different field of applications.

