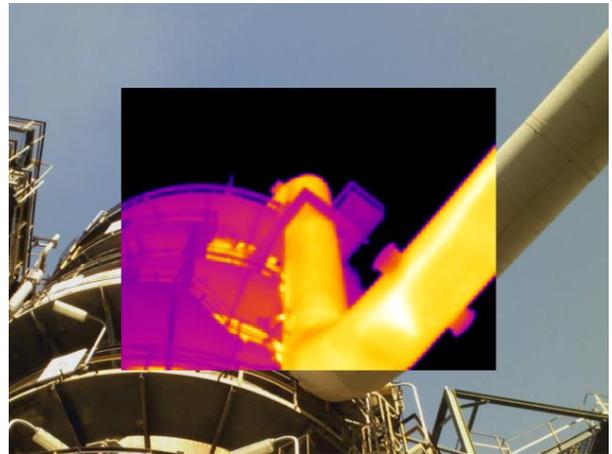


ENERGY AND ENVIRONMENTAL AUDITS

With its strong and recognized expertise, in particular by the French Energy and environment agency (ADEME), ATANOR realizes audits and diagnosis in the following fields: improvement of energy efficiency in industrial facilities, air pollutant mitigation, waste thermal treatment and green house gases (GHG) reduction.

OUR SERVICES

- Energy consumption **reduction**
- **Regulatory compliance** of installations: NO_x, SO_x, VOC and unburnt HC, particles and other pollutants
- Waste heat **recovery**
- **Conversion** to renewables
- **Improvement** of industrial unit operation / correction of malfunctions
- **Debottlenecking**
- **Training** to optimal control and management of facilities



Thermography of a flue gas duct on a FCC unit (fluid catalytic cracking)

YOUR EQUIPMENTS

- **Industrial boilers**
 - Gas, fuel oil, coal or biomass
 - From 100kW to 300MW
- **Industrial furnaces** of various types
- Waste-to-Energy plants
- Flue gas cleaning systems
- Cogeneration units
- **Other specific units** : gasifiers, pyrolizers, carbonization units, etc.



Refinery furnace audited by ATANOR

OUR MEASUREMENT TOOLS

- **Suction pyrometers** (for gas temperature inside the furnaces)
- **Flue gas analyzers**
- **Thermal camera**
- **Hot wire anemometer or Pitot tube** (for gas flow in the ducts)
- **Methodology tools**
- **CFD tools**, for numerical simulation of installations



Flue gas analyzer

OPERATIONS IN REFINERIES

→ Energy audit of heaters and boilers in several refineries:

- **ENAP (Chile):** Audit of Aconcagua, Biobio and Gregorio refinery heaters and boilers
- **KMG (Kazakhstan):** Audit of Atyrau and Pavlodar refinery heaters and boilers
- **SIR (Ivory Coast):** Global audit of Abidjan refinery
- **RICBV (Curaçao, Dutch West Indies):** Study of the conversion of La Isla refinery heaters and boilers to natural gas
- **SOCAR (Azerbaijan):** Audit of ovens
- **ANCAP (Uruguay):** Audit of boilers

→ Collaboration with AXENS, IFPEN subsidiary

→ On-site investigations, deviation assessment (KPI), development and quotation of improvement projects



Refinery oven audited by ATANOR

OTHER OPERATIONS

→ **GRAND LYON la Métropole:** Valorization of waste heat in chemical plants

→ **OSIRIS, SLS, CCIAG, LAFARGE, CPCU, etc.:** Regulatory compliance of furnaces and boilers concerning NOx emissions

→ **CEA, IFPEN:** GHG emissions evaluation

→ **Les Flandres / ADEME:** Implementation of an energy valorization process for used cooking oils

→ **EIFFAGE:** Diagnosis of a biomass trigeneration plant (heat, power and cooling) presenting severe malfunctions

→ **SIAAP:** Debottlenecking of a sludge incinerator in a waste-water treatment plant

→ **SAINT GOBAIN:** NOx Audit of electric arc furnaces

→ **ADISSEO:** Furnace audit, development of improvement projects, support for changes implementation, operator training

→ **GUERBET:** Reduction of the natural gas consumption of an incinerator

→ **OSIRIS:** Partial substitution of coal by spent tires in a steam boiler



Temperature measurement inside a heater using a suction pyrometer

→ **ARCELOR MITTAL:** Improvement of the duct design upstream an ESP to reduce fouling and erosion

→ **SANOFI:** Capacity increase of a liquid by-products incinerator

→ **GRAFTECH:** Upgrade of flow pattern in carbon baking furnaces to improve electrode quality