

SOOTAWAY

Strategies for targeted emission reductions from the Indonesian coal fleet:
fleet:
Capacity building to accelerate compliance

11-13 July 2023



SOOTAWAY

 **JOHNSEN
CHEMICALS**

SOOTAWAY

Older thermal power plants often face challenges with low efficiency and high emission of CO, NO_x, SO₂ and PM

SOOTAWAY

A combustion catalyst for solid fuel that enable a complete combustion at a lower level of Oxygen

Competing Technologies aim to reduce the **symptoms** of an incomplete combustion, e.g high emission and slagging.

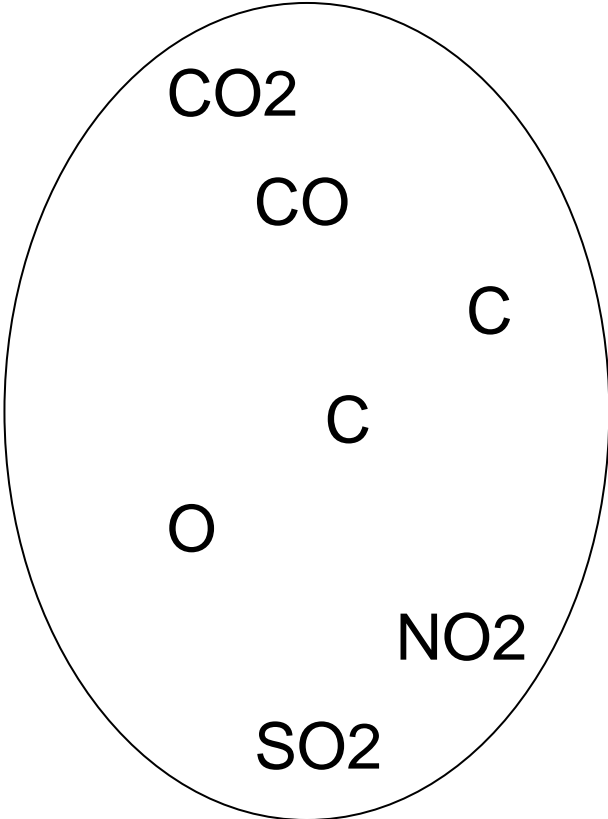
We aim **to solve** the problem.

SOOTAWAY

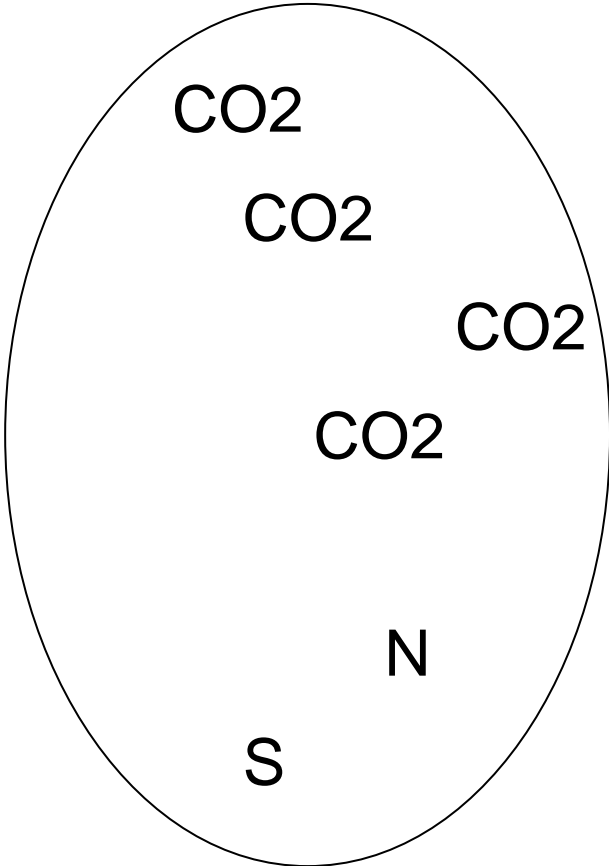


SOOTAWAY

Incomplete



Complete



SOOTAWAY

- Increases efficiency through :
 - reduction in creation of Carbon Monoxide (CO)
 - reduction of unburned Carbon in fly-ash (PM)
 - reduction of unburned Carbon in bottom-ash
 - reduction of unburned Carbon in sediments
- Increased heat transfer through :
 - Reduced level of sediments on heat exchanger

SOOTAWAY

- Reduces emission of :
 - Carbon Monoxide (CO)
 - Carbon Dioxide (CO₂)
 - Particular Matter (C)
 - Hydrocyanic Acid (HCN)
- Enables reduced level of Oxygen, which will reduce emission of
 - Nitric Oxide (NO_x)
 - Sulphur Dioxide (SO₂)

SOOTAWAY

- Reduced availability of Carbon

- Carbon Monoxide CO
- Hydrocyanic Acid HCN
- Methane CH₄
- Aceton CH₆O

- Reduced availability of Oxygen

- Nitrogen Monoxide NO
- Nitrogen Dioxide NO₂
- Sulphur Dioxide SO₂
- Sulphur Trioxide SO₃

SOOTAWAY

- Reduces corrosion:
 - Reduced content of SO₂ and HCN in boiler
 - Create a protective layer inside boiler
- Reduces maintenance
 - Reduced building of sedimentation
 - Reduced corrosion

SOOTAWAY

Application
system from
Dongamahua,
India



SOOTAWAY

 **JOHNSEN
CHEMICALS**

SOOTAWAY

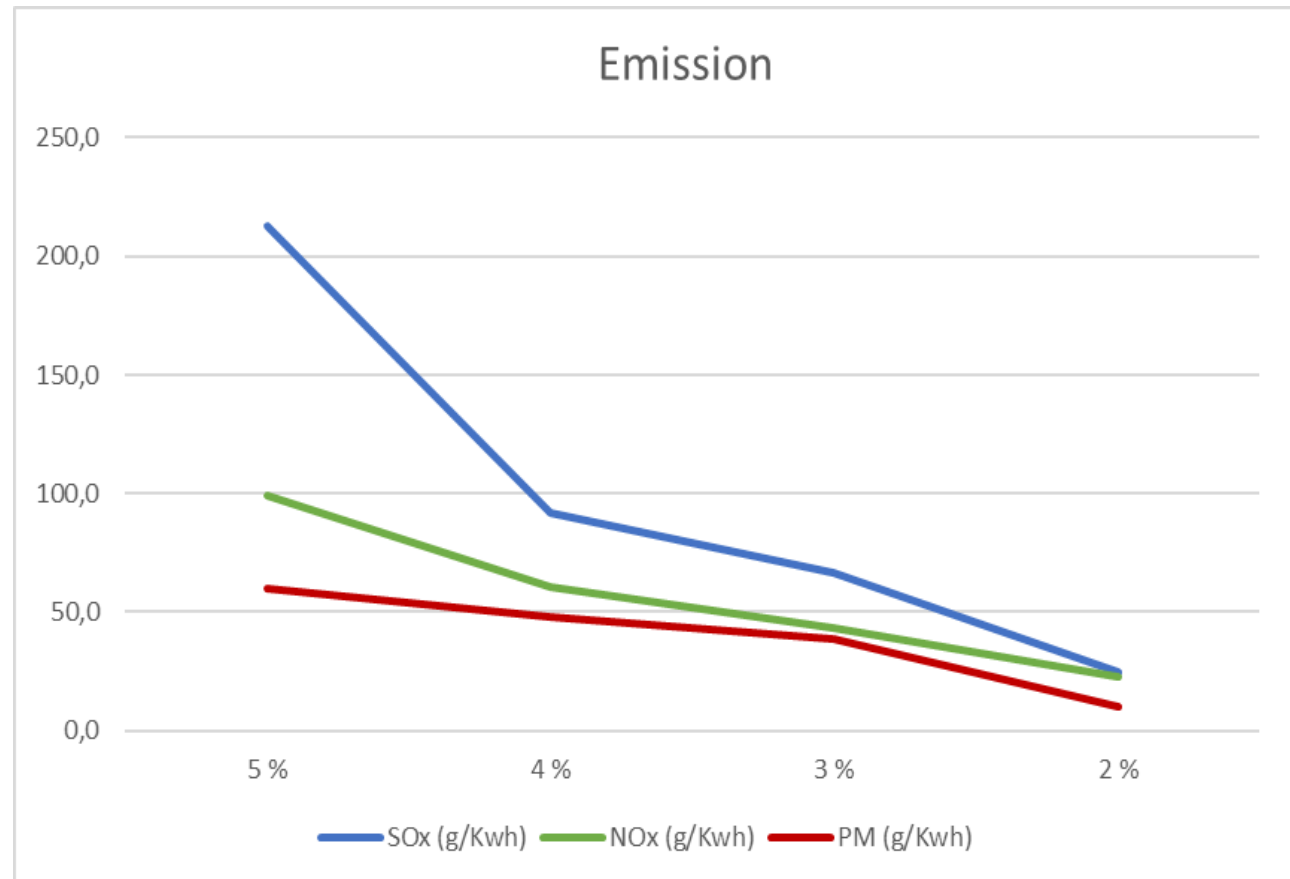
REFERENCES COAL

Lab test, Geocoal, India

reduced airflow for optimal emission control

- 88% SO₂
- 77% NO_x
- 83% PM

- 85% Slag



Jelcz, Poland

constant airflow for both emission control and fuel efficiency

Without Sootaway

With Sootaway

CO : -33%

CO2 : +15%

O : -18%

NO : -25%

NO2 : -88%

SO2 : -34%

HCN : -85%

| Component | Concentration | Unit | Component | Concentration | Unit |
|-----------------------|---------------|-------|-----------------------|---------------|-------|
| Water vapor H2O | 6.86 | vol-% | Water vapor H2O | 4.00 | vol-% |
| Carbon dioxide CO2 | 7.46 | vol-% | Carbon dioxide CO2 | 8.60 | vol-% |
| Carbon monoxide CO | 123.48 | ppm | Carbon monoxide CO | 83.22 | ppm |
| Nitrous oxide N2O | 3.25 | ppm | Nitrous oxide N2O | 0.00 | ppm |
| Nitrogen monoxide NO | 122.41 | ppm | Nitrogen monoxide NO | 92.30 | ppm |
| Nitrogen dioxide NO2 | 8.84 | ppm | Nitrogen dioxide NO2 | 1.08 | ppm |
| Sulfur dioxide SO2 | 356.57 | ppm | Sulfur dioxide SO2 | 234.53 | ppm |
| Hydrogen chloride HCl | 23.64 | ppm | Hydrogen chloride HCl | 35.71 | ppm |
| Methane CH4 | 5.51 | ppm | Methane CH4 | 0.32 | ppm |
| Formaldehyde CHOH | 0.00 | ppm | Formaldehyde CHOH | 0.00 | ppm |
| Methane % | -0.01 | vol-% | Methane % | -0.00 | vol-% |
| Aceton C3H6O | 71.66 | ppm | Aceton C3H6O | 0.00 | ppm |
| Amoniak NH3 | 0.00 | ppm | Amoniak NH3 | 0.00 | ppm |
| HCN | 95.94 | ppm | HCN | 14.66 | ppm |
| Tlen O2 | 9.68 | | Tlen O2 | 7.98 | |

SOOTAWAY

Dongamahua, India

increased airflow for optimal fuel efficiency

CO : -60%
SO2 : -31%
NOx : - 11%
Coal : -10%



SOOTAWAY

 **JOHNSEN
CHEMICALS**

SOOTAWAY

Strategies for targeted **emission reductions** for **Suralaya 6**
Capacity building to accelerate compliance



SOOTAWAY

 **JOHNSEN
CHEMICALS**

Suralaya Unit 6

By applying 1 liter of Sootaway per 1 ton of coal used, based on experience we expect following results

- | | | |
|-------------------------------|-----------|---------|
| • Airflow | unchanged | reduced |
| • Coal consumption | - 3% | -2% |
| • Emission of SO ₂ | -57% | -69% |
| • Emission of NO _x | -39% | -56% |
| • Emission of PM | -20% | -35% |

Sootaway application can strongly support Suralaya 6 towards compliance without high investments in Scrubbers

SOOTAWAY



Ombilin Unit 1

- Unchanged airflow :
 - **12% reduction in coal consumption**
 - 57% reduction in emission of SO₂
 - 39% reduction in emission of NO_x
 - 20% reduction in emission of PM

Sootaway application very much able to support Ombilin in being more efficient and being more compliant.

SOOTAWAY

- Based on technical details from each power plant we can, together with plant management estimate :
 - Reduction in fuel consumption due to improved combustion and improved heat transference
 - Reduction in cost of Ammonia for SCR
 - Reduction in cost of Limestone for Scrubber
 - Reduction in cost of shutdown for cleaning
 - Reduction in CAPEX of investment in SCR/Scrubber

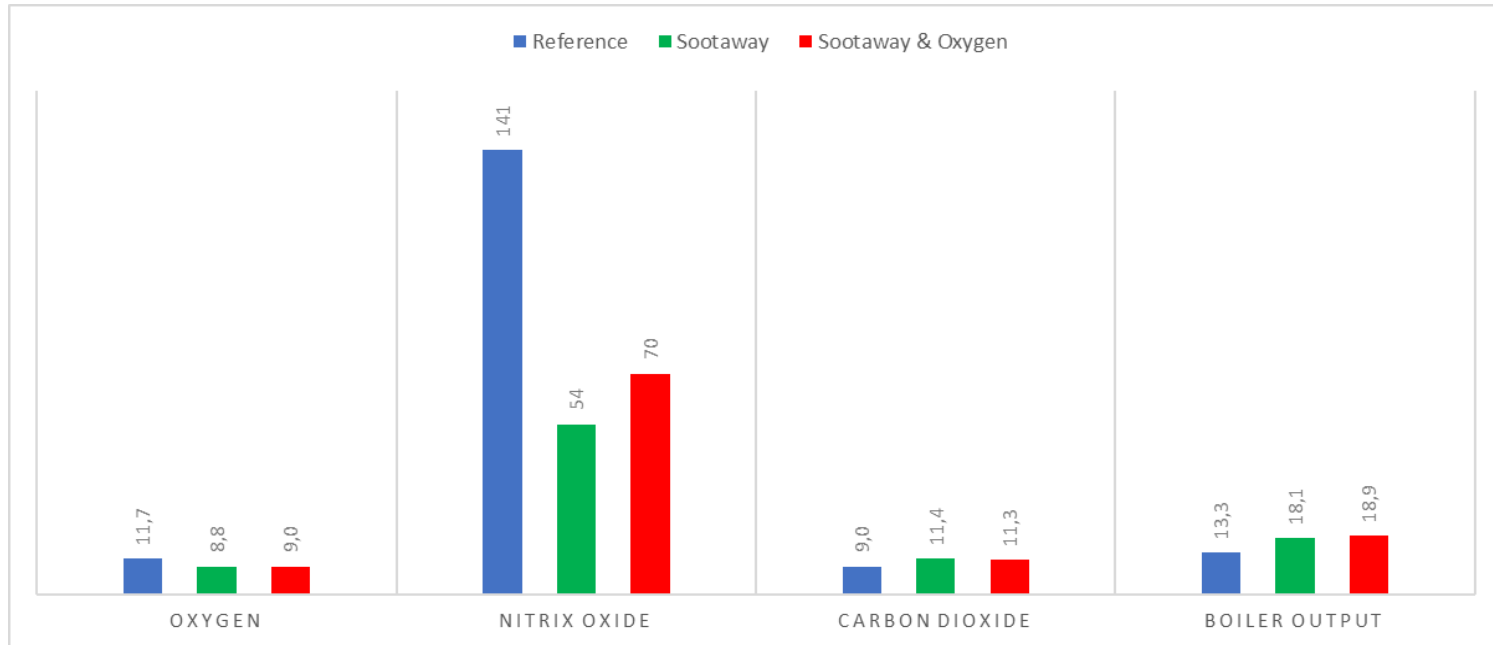
SOOTAWAY

REFERENCES BIOMASS

SLAGGING & HEAT TRANSFER
UTILIZATION OF CALORIFIC VALUE

Lab test biomass, Opole University

unchanged and (*increased*) airflow



-25% Oxygen, -62% NOx and +36% boiler output

(*-23% Oxygen, -50% NOx and +42% boiler output*)

Sootaway very much reduces the issue of slagging that comes with the use of Biomass

Guren Gartneri, Norway

increased airflow for optimal fuel efficiency

- Fuel consumption is reduced by 13%
- Time between cleaning is increased by 3
- Volume of bottom-ash is reduced significant



SOOTAWAY

Sootaway will enable PLN to increase Biomass content without increasing risk of slagging.

SOOTAWAY



SOOTAWAY

Thank you
and

We look very much forward to support
PLN in improving Efficiency and
Reducing Emissions.

SOOTAWAY



Contact info

Johnsen Chemicals AS

Trollasveien 36, 1414 Trollasen, Norway

CEO : Leif Veбенstad

Phone : 47 91331089

Mail : leif@johnsenchemicals.com

SOOTAWAY

