

Sulf-Norm: Metrology for Sampling and Conditioning SO₂ Emissions from Stacks

The prenormative work delivered by this project will facilitate the implementation of the Industrial Emissions Directive (2010/75/EU). Full implementation is predicted by the Commission (COM(2007) 843 final) to lead to a reduction of 13,000 premature deaths, 125,000 years of life lost, and associated savings of up to €28 billion p.a.

Economic and Societal Drivers

€102 – 169 billion p.a. cost of EU air pollution (European Environment Agency TR 15/2011).

Linear relationship between SO₂ pollution and mortality (Aphekom project, European Commission, DG Environment News Alert, Issue 375, 5th June 2014).

National Emission Ceiling Directive target of 50% reduction by 2010 (compared to 1990) in critical loads of acid deposition no longer met (European Environment Agency TR No 14/2012).

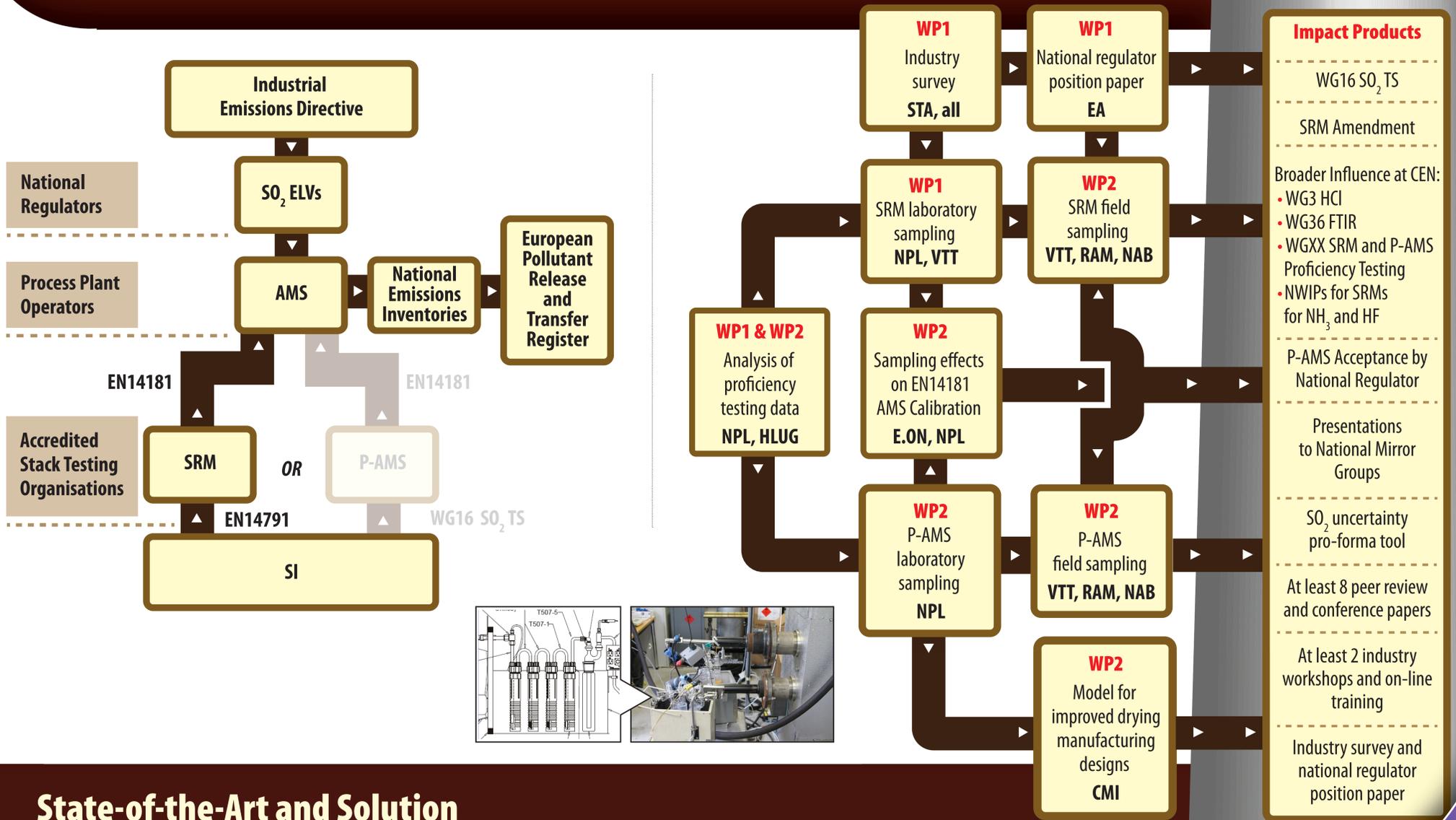
Directive Requirements and CEN Needs

Increasingly stringent emission limits are coming into force under the 2013 Industrial Emissions Directive - IED (2010/75/EU).

CEN Standard Reference Methods (SRMs) produced by CEN / TC264, Air Quality, in the early 2000's to support previous directives no longer fit for purpose for some applications. e.g. the IED requires an SO₂ uncertainty of ±1.0 mg.m⁻³, whereas the uncertainty of the SO₂ SRM (EN 14791) is ±1.7 mg.m⁻³

Sampling apparatus of the SRM incompatible with smaller plants (1-50 MW) due to be regulated under the proposed Medium Combustion Plant Directive (COM(2013) 919 final).

CEN / TC264 identified future work items: 'identify new monitoring requirements of the IED'; 'assessment of current SRM to meet stricter emission limit values'; 'automated methods for measuring emissions'. (N2204, CEN / TC264 Future Work Items, March 2014).



State-of-the-Art and Solution

SRM (EN 14791) extracts a gas stream from the stack and passes it through glass impingers filled with H₂O_{2(aq)}. The solution is analysed off-line in a chemistry laboratory (ion chromatography).

The SRM could be replaced by P-AMS (portable automated measuring systems): a sampling system coupled with an analytical instrument (e.g. non-dispersive infrared – NDIR).

P-AMS are capable of lower uncertainties, provision of real-time data and reduced labour costs.

However, P-AMS cannot handle hot and wet gas streams (e.g. 400 °C, up to 40% vol H₂O). Hence, conditioned sampling is required where water vapour is removed from the stream. Proposed conditioned sampling systems are available but have not been characterised and validated.

TC264 / WG16 are in the process of producing a standard for P-AMS based monitoring of SO₂ emissions. However, initially this will be published as a CEN Technical Specification (TS): for this document to be elevated to full EN status conditioned sampling must be characterised and validated.

Impact

Stakeholder	Impact Mechanism
CEN community	Up to 6 standards (including the SO ₂ TS) covering a range of pollutants regulated under the IED where conditioned sampling is relevant
Stack Testing Organisations	Improved quality and decreased labour costs
Plant Operators and National Regulators	Real-time data decreasing exceedances, improving compliance with regulation and public perception of industry reputation, and regulator enforcement
Instrument Manufacturers	Acceptance of a method for SO ₂ by P-AMS opening up the instrument market. In excess of \$1 billion p.a. is spent globally on emission monitoring instrumentation (11th International Conference and Exhibition on Emissions Monitoring)

