EPOS Technology Focus - Flue and Process Gases

Project:
Enhanced energy and resource Efficiency and Performance in process industry Operations via onsite and cross-sectorial Symbiosis

The EPOS project brings together 5 global process industries from 5 key relevant sectors: steel, cement, chemicals, minerals and engineering.

EPOS's main objective is to enable cross-sectorial Industrial Symbiosis (IS) and provide a wide range of technological and organisational options for making business and operations more efficient, more cost-effective, more competitiveand more sustainable across process sectors.

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Sector:

Cement

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Ceramics

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Chemicals

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Engineering

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Minerals

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Non-ferrous metails

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Steel

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Water

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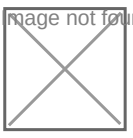
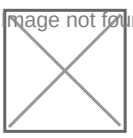
Summary:

EPOS Technology Focus: Within the scope of the EPOS project, extensive literature and market research reviews were performed in order to identify different technological, organisational, service and management solutions that could be applied to different industrial sites and clusters. The collected information will aid in establishing on-site and/or cross-sectorial industrial symbiosis opportunities; additionally, to enhance overall sustainability, performance and resource efficiency of different process industry sectors. Through the cooperation of project partners, a longlist of different technological options was created. Resource material for this list included: scientific articles, project reports, manufacturer's documentation and datasheets.

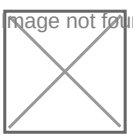
Flue and process gases: The emission of flue gas is one of the most significant issues that process industries must deal with. Flue gas is a result of combustion, taking place in ovens, furnaces, boilers, etc. The composition of the flue gas relates to the type of source that is burned; mainly consisting of water vapour, carbon monoxide, carbon dioxide, particulates, nitrogen oxides and sulphur oxides.



Membrane separation
Condensation and cryogenic condensation
Adsorption
Wet gas scrubber
Bio-filtration
Bio-scrubbing



Bio-trickling
Moving-bed trickling filter
Thermal oxidation
Catalytic oxidation
Ionisation
Photo/UV oxidation



Pre-combustion capture
Post-combustion capture
Chilled ammonia process (CAP)

Calcium looping adsorption

High efficiency amine based solvents scrubbing

Oxy-fuel with post-combustion

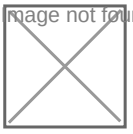
CO_2 storage in enhanced oil recovery

CO_2 Mineralisation

Water-gas shift reaction and reverse water-gas shift reaction

Sabatier process for methane production

Photovoltaic assisted algal carbon conversion bioreactor



Anthropogenic chemical carbon cycle

Production of methanol by synthesis of CO_2 and hydrogen

Artificial photosynthesis

Utilisation of CO_2 for urea production

Utilisation of CO_2 for production of the polyurethane

CO_2 liquefaction methods

Keywords:
Technology, Industry, Sustainability, Flue Gas, Process Gas, Recovery, Carbon
Type:
Case study
Education/training materials
Other
Rights:

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