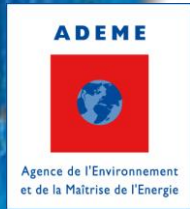


EGTEI
Warsaw, 22nd november 2011
Emerging technologies sub-group
(EmTech 50-500)

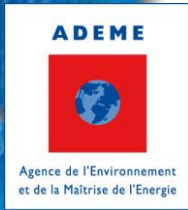
Progress in the work

Emmanuel FIANI



EmTech50-500

- Mandate by WGSR47
 - “Continue the work on emerging technologies for combustion plants lower than 500 MW”
 - EmTech 50-500 builds on the work completed by LCP2030 on LCPs > 500 MWth (july 2008).
 - EmTech 50-500 also builds on work achieved by other EGTEI sub-groups (eg SCI sub-group)
- **Overall aim of the sub-group**
 - get new information on abatement techniques and technologies which are emerging
 - useful for
 1. extending the abatement techniques/technologies in the GAINS model (remaining gap between MTFR and no-effect level) and
 2. for the LCP BREF revision which started earlier this year → confirmed at KOM at the end of october 2011
 - Why 50 MWth?: because of current Gothenburg Protocol



EmTech50-500

What is an emerging technology?

- Pilot plant scale and demonstration plant scale
- Improvements of existing abatement techniques / technologies
- Techniques / technologies applied in other domains (emerging applications)
- New abatement techniques / technologies

Detailed aim of EmTech50-500

- Time horizon: 2030
- Information gathered on: environmental performance (**NOx, S, PM**), rate of penetration for new and existing plants, **energy consumption/CO2 impact**, costs.

Focus (or not focus)

- 50 and 500 are not strictly fixed borders: possibilities of downscaling or upscaling
- Peak loads plants are not in the scope
- Combustion plants in the sense of the LCP directive
- Natural gas, hard coal and biomass = priority
- Technologies causing no significant air emissions not in the scope (eg fuel cells)

EmTech50-500 DRAFT REPORT PROVIDED BY KIT – NOV 2011

Description of techniques/technologies :agreed format (fact sheets)

- **BREF-style items** for reader-friendliness:

- Description
- Achieved environmental benefits, with a summary dedicated to priority pollutants
- Applicability
- Operational data
- Economics
- Driving force for implementation
- Reference literature

- Besides (*before*) these “BREF-style” items, **some specific items** are included:

-**Status boxes : technology / pollutants** → main discussion today of yesterday session

- Potential
- Status of
 - Research
 - Implementation (to show market forces and soon readiness for commercialization)
 - Indicators to monitor market penetration
 - Proposal to update these indicators every 2-4 years

EmTech50-500

28 technologies taken into account for in-depth assessment.

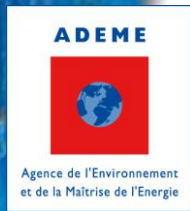
- Solid fossil fuel combustion technologies
 - Integrated Gasification Combined Cycle (IGCC)
 - Lignite Predrying in Fluidized Beds (WTA Drying)
 - Pressurized Steam Fluidized Bed Drying (PFBD)
- Technologies for the use of biomass
 - Types of biomass gasifiers
 - Co-Combustion of Biomass
 - Biomass fuelled IGCC (BIGCC)
 - Biomethane (Bio-SNG) production of solid biomass
- Gaseous fuel combustion technologies
 - H2 Gas Turbines
 - HTFC-GT / HTFC-MTG Hybrid Generation Systems
 - Catalytic Combustion of Natural Gas
 - Ultra low NOx burners for Oil and Gas Combustion
 - Swirl Flash
 - Flameless Combustion of Gaseous Fuels



EmTech50-500

28 technologies taken into account for in-depth assessment (cont.).

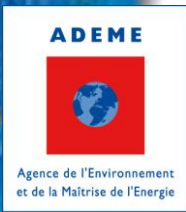
- CO2 abatement techniques and technologies
 - CO2 Scrubbing by Physical Absorption
 - CO2 Scrubbing by Chemical Absorption
 - EnergiCapt – Capturing CO2 in small units
 - Oxyfuel combustion: Oxyfuel in PC combustion, Oxyfuel in CFB combustion, In-situ Oxygen membranes for Oxyfuel boilers , Activated Carbon Multi Pollutant Abatement Technique for Oxyfuel Gases
- Pollutant reduction by efficiency increasing technologies
 - H-Class / J-series natural gas turbines
 - 650°C/700°C Technology in coal combustion
- Mono-pollutant abatement techniques
 - High efficiency wet FDG plants for CO2 capture
 - Hot Gas Ceramic Filters
 - SO3 Injection
- Multi-pollutant abatement techniques
 - SCONOX
 - (WSA) SNOX-ESAP
 - Catalytic Ceramic Filter



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Techniques, which have not been considered:

- For smaller appliances:
Ultra Low NOx Infrared Burners, Methane SCR
- Not in core activity:
Shell FGD Process, SELOX for H₂S Removal
- Not core pollutants:
Activated Coke for PCDD/F Removal in Biomass, Additives for Abatement of Alkaline Emissions in Biomass Combustion, Hg Removal with Activated Coke
- No further developments could be identified in the last years:
Indigo Agglomerator, Electron Beam Radiation, SNRB, COHPAC, TOXECON, ZnO-based Processes, NOXSO



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Status boxes:

- Need to provide easy-readable information for non experts
- Available at the beginning of the fact sheets and in the summary
- Qualitative approach suited to emerging technologies

Example: CO₂ Scrubbing by Chemical Absorption

Technology Status				Pollutant Abatement Capacity				
Lab. scale	Pilot scale	Demo. scale	Comm. Scale	Direct emissions				Indirect emissions through plant efficiency
				NO _x	SO ₂	PM	CO ₂	
				0	+	+	++	--
Reference: BAT pulverised coal combustion plant								

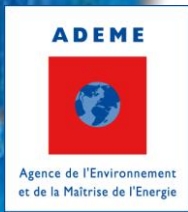
EmTech50-500

Process (secretariat by KIT)

1. Data collection:
 - bibliographical study + proactive contact (suppliers,...) by KIT
 - information from EmTech50-500 members (reports, experts,...)
2. First analysis of this information by KIT
3. Final analysis by the sub-group
4. Report to EGTEI

Where are we now?

- 5 meetings:
 - Paris, 02 feb 2011 : KOM (scope issues)
 - Rome, 05 may 2011 : technologies presentations and discussions
 - Paris 22 june 2011: technologies presentations and discussions
 - Paris 12 oct 2011: data analysis, agreement on report structure
 - Warsaw 21 nov 2011: status boxes discussion
- **Draft report : november 2011**
 - There are some fact sheets where data is scarce
 - There are some status boxes for which additional expertise is needed



EmTech50-500

Planned next steps

- 21 nov 2011: final meeting in Warsaw
- **15 jan 2012 : final deadline for comments + additional information from your country or your industrial sector**
- 31 jan 2012: final report completed
- **February: final report will be circulated (electronically) among EGTEI for approval**
- Mid-march: final report will be sent to the LRTAP Convention secretariat
- End of march: final report will be sent to LCP BREF TWG
- And then, several possibilities:
 - WGSR presentation?,
 - report will be available as a pdf file,
 - ADEME will produce a number of hard copies (how many are needed?),
 - translation issues (is Russian translation needed?)
 - Possible communication through scientific conferences or technical journals.
 - Possible re-assessment of emerging technologies in 2-4 years ?