





Large scale experiences on biomass feeding, co-firing and sorbent performance

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Economic low carbon power Production and Emissions Control for Future and Flexible Biomass Co-fired Power Stations

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Test campaign structure & goals

Results

Conclusions





CO₂ geological storage Hontomín (N Spain)









Schematic PFD





Block	Fuel	Specific objectives	
Block #1	Anthracite and torrefied biomass	Fuel preparation system: fuel milling in the existing ball mill.	
Block #2	Bituminous	Different additives for control of acid gases and Hg	Sor Pacat and Attatree F einkak 1-209
Block #3	Bituminous and sawdust	Impact of co-combustion of biomass on emissions	







Block#1 Fuel selection...lab tests





Block#1 Results









Sorbent rate	Injection point	Goals / Comments
-	N/A	BASE case OXY Mode
High	SCR	SORBACAL® SPS
Low	SCR	SORBACAL® SPS
Low	uBF	SORBACAL® SPS, Bag Filter injection
High	uBF	SORBACAL® SPS in Bag Filter injection
Low	uBF new	PAC blend (silo 2)





Block #2 SO₂/SO₃ abatement

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Ratio Ca/S



Block#2 Hg abatement





Test code







Kmol sorbent /h



Block#3 Co-firing







on
on
or



Block#3 SO₂





Sorbent mass flow rate (kg/h)



Block#3 HCI

Air mode

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Sorbent mass flow rate (kg/h)



Conclusions

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Co-milling process performed in a semi-industrial ball mill designed for coal, **achieving a ratio higher than 30 %**_{th} **basis** with chipped torrefied biomass

3 % w of moisture was reached at the outlet of the mill

PSD at the outlet of the mill: more than 40 % with a size lower than 75 micras

The production was low in comparison with the design value of production for coal

SO₂ abatement was performed in air (38 %) and oxy mode (46 %) with a Ca/S of 1,5. With the same sorbent, 50 % of **HCI** was removed in air mode

Hg abatement: activated carbon was injected obtaining and efficiency of 50 %

Co-combustion tests in air and oxy were carried out in one of the existing horizontal burners in the PC boiler, using bituminous coal and sawdust as fuels. The maximum ratio of co-combustion reached in the burner was 36 % th basis.





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Thank you for your attention

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