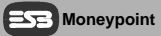


Moneypoint Environmental Retrofit Project

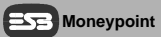
Presentation Outline

- Background
- FGD Process
- SCR Process
- Progress / Programme

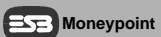
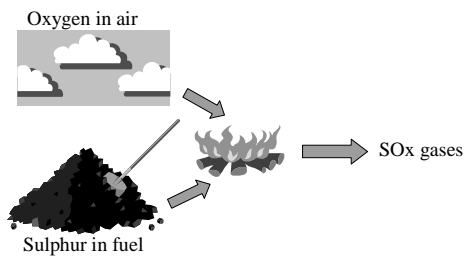


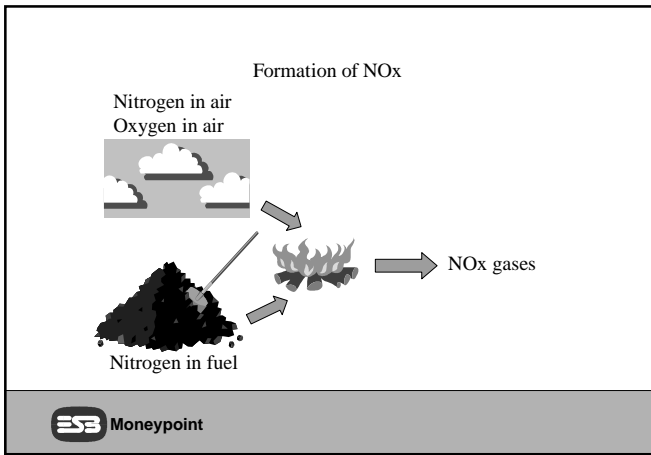
Legislation

- Large Combustion Plant Directive LCPD
 - Covers emissions of Sox, Nox and particulates from particular plant
- National Emissions Ceiling Directive NECD
 - Covers entire country emissions
- Kyoto Protocol
 - Covers green house gasses (global)
- National Climate Control Strategy NCCS
 - total emissions for Ireland



Formation of SOx





**FGD Process-
Objectives SO₂ / Dust Removal**

Current Emissions

- Up to 3400mg/Nm³ SO₂
- Up to 150mg/Nm³ Dust

Large Combustion Plant Directive LCPD requires: -

<u>Jan 2008</u>	<u>Jan 2016 (or earlier)</u>
Below 400mg/Nm ³ Below 50mg/Nm ³ Dust	Below 200mg/Nm ³

ESB Moneypoint

**SCR Process-
Objectives NO_x Removal**

Current Emissions

- Up to 1100 mg/Nm³

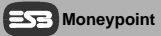
Large Combustion Plant Directive LCPD requires: -

<u>Jan 2008</u>	<u>Jan 2016 (or earlier)</u>
Below 500mg/Nm ³ on Coal Below 400mg/Nm ³ on Oil	Below 200mg/Nm ³

ESB Moneypoint

FGD Process

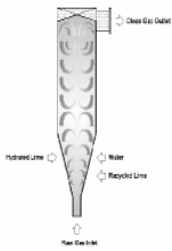
- SO_x (SO₂ & SO₃) is reduced by reacting it with Lime (CaO)
 - By-product
 - Calcium Sulphite CaSO₃
 - Calcium Sulphate CaSO₄
 - Calcium Carbonate CaCO₃
 - Also
 - Calcium Hydroxide Ca(OH)₂ (un-reacted lime)
 - Flyash
 - Before Land-filling this is mixed with Fly ash



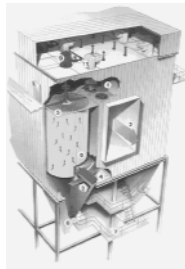
Dry FGD – Circulating Fluidised Bed Absorber



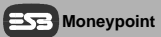
Circulating Fluidised Bed FGD Absorber with Bag Filter



How it works



Bag Filter (Dust Removal)



Dry FGD Related Equipment

- FGD
 - Lime Hydration



SCR Process

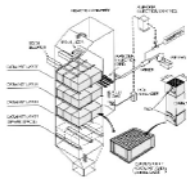
- NO_x is reduced by reacting it with Ammonia
 - In the presence of a Catalyst
 - By-products
 - Nitrogen
 - Water vapour



SCR Process



SCR Installed



SCR Schematic



SCR Catalyst



SCR - Ammonia Production from Urea

Urea Production Plant



End View with storage

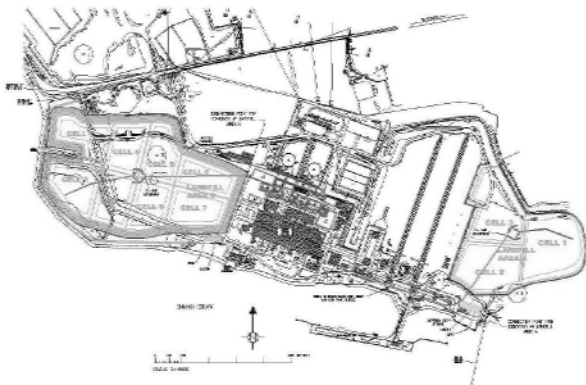


FGD By-Product Landfill Material Handling

- Landfill
 - FGD By-Product + Fly Ash + H₂O + cement
 - Stabilises FGD By-Product
 - Estimated Production of mix 150,000 m³ / year
 - Light concrete properties

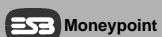


FGD By-Product Landfill Material Handling



Local Impacts

- Operations**
- Clean Gas Emissions
 - Moneypoint complies with the latest Environmental Legislation
 - Moneypoint can continue to operate beyond 2008
- Employment**
- Moneypoint will continue to provide employment in Clare
 - Permanent Station Employee's
 - Temporary Employee's (Overhauls / Contractors / Services)
 - Construction phase (up to 300 until complete at end 2008)
 - New Employment ? Lime Production
- Supplies**
- Burnt Lime (60k tonne annually)
 - Urea (up to 16k tonne annually)
 - Increased Water consumption (up to 4000 tonnes per day at full capacity)
- Transport**
- Net increase of Trucks @ 2/3 per week



Progress to Date

Key Milestones already achieved:

- Planning Permission granted
 - FGD
 - SCR
 - Landfill
- IPC Licence revision granted
 - Change to process to include FGD / SCR / Landfill



Contracts

- Turnkey Contract has been signed with LURGI for the delivery of the Environmental controls
 - Contracted works include
 - Flue Gas Desulphurisation plant inc. Lime handling plant
 - Selective Catalytic Reduction plant inc. Urea to Ammonia plant
 - All Civil Works
 - Electrical supplies, (additional Unit Transformer)
- Contract for Control Systems Retrofit expected to be signed by end September
 - Contracted works include
 - Unit Control system
 - Common Plant Control system
 - Fuel Handling Control system
 - Control room Man-Machine Interface