



**ANGLO
COAL**

Early Deployment Opportunities in Emerging Economies

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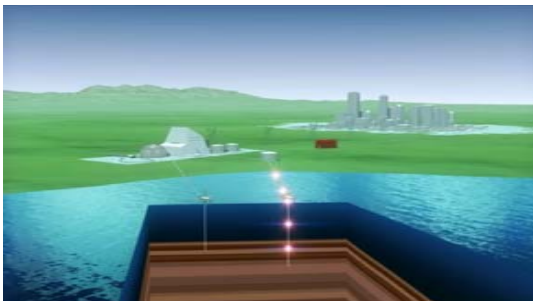
Anglo American - Anglo Coal

- Global producer of minerals - including coal
- Clean coal technology strategy
- Strong presence in emerging economies



Near Term - Step Reduction of Coal Mine Emissions

- Methane capture and utilisation - new technologies



Medium Term - Zero Emission Coal Utilisation

- Gasification & CCS key technologies
- Planned projects in China and Australia
- Member of FutureGen Industrial Alliance

- **Economic viability requires two or more of:**
 1. **A concentrated, low-cost CO₂ source**
 - natural gas processing by-product
 - coal syngas processing by-product
 2. **Access to a secure, low-cost CO₂ injection site or sink**
 - as near as possible
 - high permeability reservoir
 - adequate secure capacity
 3. **An equivalent cost off-set**
 - enhanced oil recovery revenue
 - emissions reduction policy incentive



Courtesy Statoil

Sleipner

- ✓ natural gas processing source
- ✓ adjacent superb storage reservoir
- ✓ CO₂ emissions tax incentive



Courtesy Dakota Gasification Company

Beulah-Weyburn

- ✓ coal syngas processing source
- 300 kilometre pipeline
- ✓ enhanced oil recovery revenue

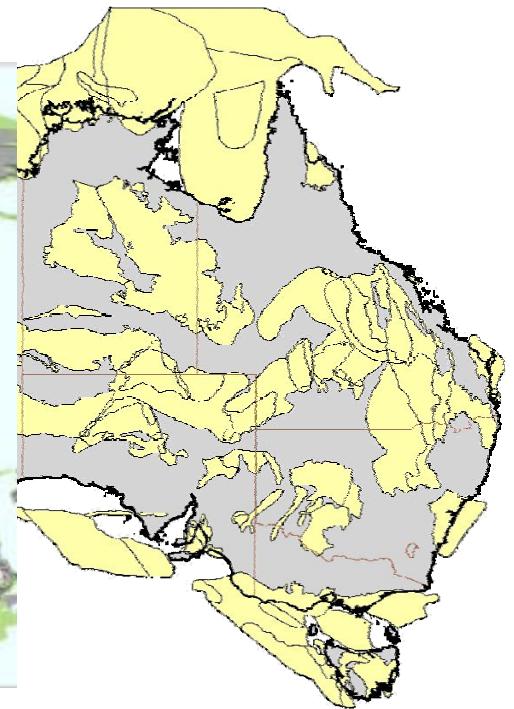
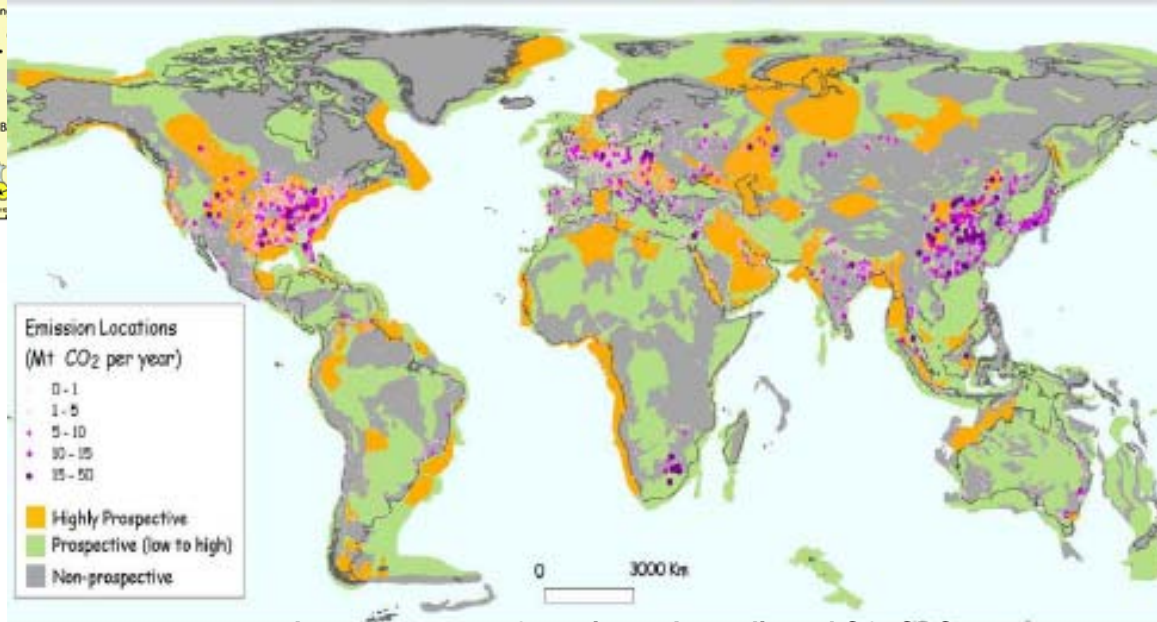
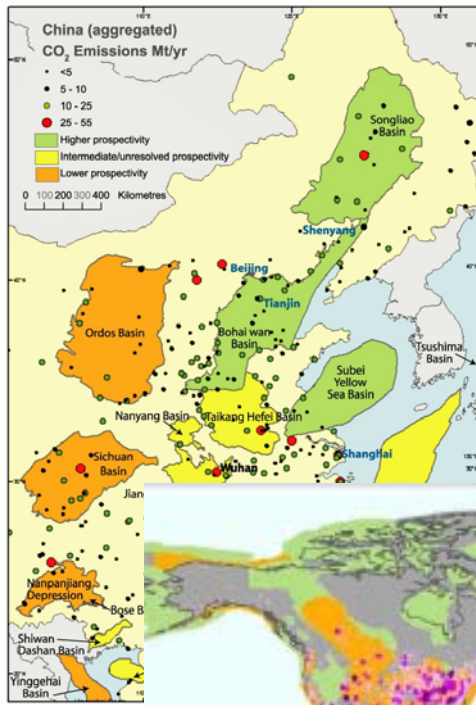
Scope for replication in emerging economies

- **Low-cost CO₂ sources are well known:**
- ✓ **Coal syngas CO₂ sources are concentrated in emerging economies**
 - China produces > 50 Mta CO₂ from ammonia plants
 - South Africa > 30 Mta CO₂ from Coal-to-Liquids plants
- ✓ **Natural gas resources containing CO₂ are widely distributed**
- **Potential CO₂ sinks are not well known:**
- **Detailed storage assessments restricted to developed economies**
-

Storage mapping and source-sink matching

Systematic storage mapping is a priority

- focus on emissions intensive regions
- source-sink matching to rank opportunities
- programs starting in China, India and South Africa
- several years work required



Images courtesy Geoscience Australia and CO2CRC

Potential low-cost projects still need an incentive

- **Enhanced oil recovery is a localised option now:**

Several projects already in China

- **Emissions reduction incentives needed for widespread deployment:**

CDM accreditation process underway

Long-term framework required for CCS applicability

- **Low-cost CO₂:**
 - Now - natural gas and coal syngas processing by-product
 - Future - reduction in capture costs from power generation
- **Low-cost sinks:**
 - Soon - systematic mapping and characterisation programs first
 - not everywhere
- **Incentives:**
 - Now - localised enhanced oil recovery
 - Soon? - emissions reduction incentives