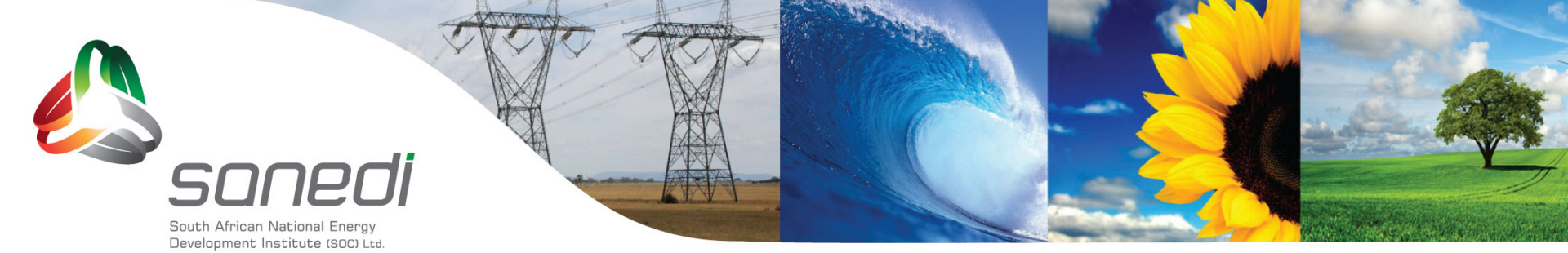

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CCS with Industrial Emission Sources

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Seoul

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- Introduction
- Metrics
- Economics
- Current level of the technology
- Country examples

Introduction

- Select aspects to focus on.
- Use of existing information (ETSAP technology information, IEA: A focus on Industrial Applications)
- Country specific examples including:
  - Type of industry
  - Local competitiveness
  - International experience applied/modified to specific countries

Metrics

- Composition of flue gas or feedstock (e.g. Natural gas).
- CO2 quantities, on national and company level
- Quantify impacts on national emissions
- Requirements for CO2 transport and storage

Economics

- Drivers for CCS (potential for large scale use, e.g. EOR and future EGR, carbon tax, CDM, national carbon trading)
- Cost of capture and impact on plant efficiency
- Cost of transport and storage (local conditions)
- Impact on competitiveness (locally and internationally)
- Focus on lowest cost CO2 containing streams

Current level of technologies

- International developments
  - Iron and steel
  - Cement industry
  - Chemical and petrochemical industry
  - Refineries
  - Natural gas processing
  - Pulp and paper industry
  - Aluminium production
- National technology level
  - State of the art technology (Best practices)
  - Older technologies (retrofitting, remaining plant live)

1. *Table 1 Worldwide carbon dioxide emissions of the largest emitting industrial sectors*[i]

Industry	carbon dioxide emissions (Giga tonnes/y)	carbon dioxide concentration
Iron and steel	2.5	Depending on stream
Cement	2.1	25-35%
(Petro)Chemicals	1.3	variable
Refining	0.7	8-12%
Natural gas processing	0.2	0-30% and more
Pulp and paper	0.2	variable
Aluminium	0.1	8-12%
Electricity generation[ii]	*10*	*10-12%*

[i] IEA Global action to advance Carbon Capture and Storage, A focus on Industrial applications. Annex to Tracking Clean Energy Progress 2013

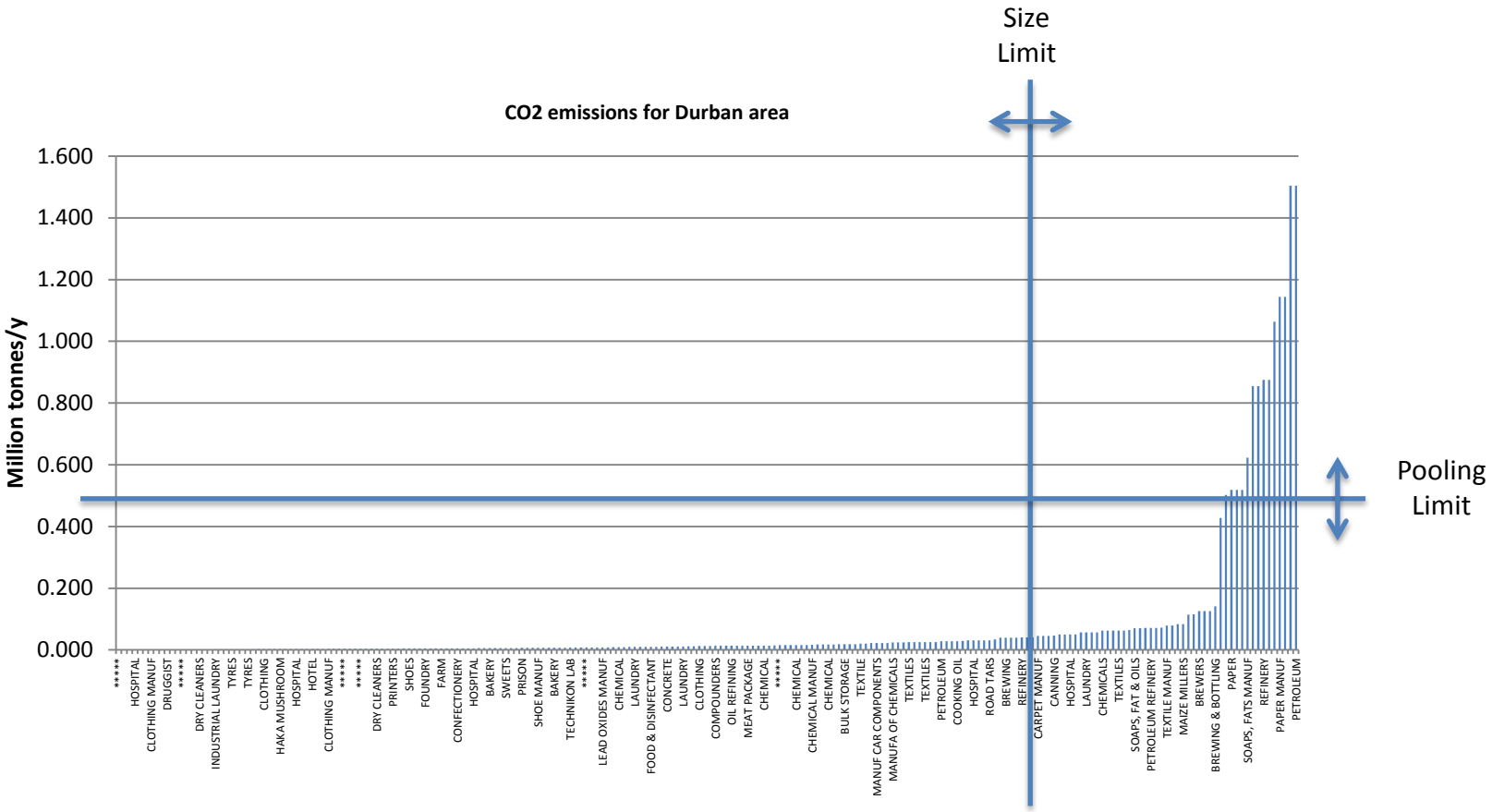
Country examples (South Africa)

- Overview of economy focussing on CO2 emitting industry
  - Country specific environment, commitments
- Availability of suitable storage sites
- Legislative environment
- Public acceptance
- Large emitters
  - Own capture plant?
  - Own/shared pipeline?
- Small emitters
  - Applicability of international experience (COCATE)
  - Combining emission?
  - Combining CO2 streams?

Durban case study

- Relatively close to potential offshore storage site
- Large number of emitters in a small area in and around Durban
- A large number of very small to small emitters
- A small number of large emitters

Estimated CO2 emissions, Durban area



Applicability of COCATE results

- Large size (>500,000 tonnes/y
  - Individual capture
  - Reduce impurity concentrations to acceptable levels
  - Combine concentrated streams for trunk pipeline transport
- Pooling size (> 40,000? tonnes/year, < 500,000 tonnes/y)
  - Compatibility of impurities in stream
  - Acceptable carbon dioxide concentration
  - Close proximity

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THANK YOU

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