March 3, 2005

Importance of Information Management for
Environmentally Sound Technologies (ESTs) Transfer
(UNEP/GEC Session)

Reuse of Seawater for Flue Gas Desulfurization

–Its Practical Information From An Engineering Point Of View–

FGD Project Headquarters
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- **Combustion of fossil fuels (e.g., coal and oil) → resulting in emissions of sulfur dioxide (SO_2), which can harm human health and deteriorate environments (acid deposition)**

- **Thailand's power generation capacity → 25,380 MWe (2002)**

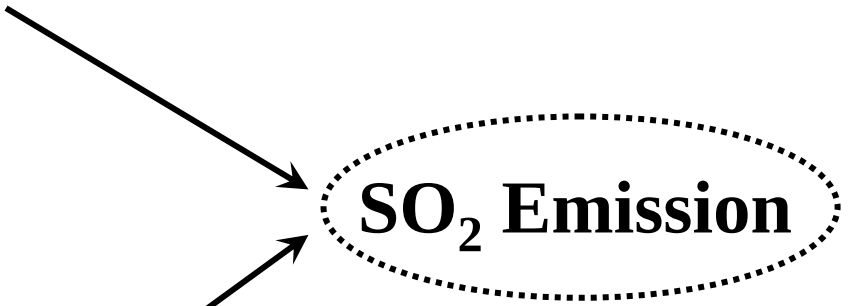
  ↓ *Δ~ 20,000 MWe (being expanded)*

  45,420 MWe (forecast for 2016)

- **As available worldwide together with its low cost, coal → still playing a significant role in power generation**

Total World Electricity Generation (2001)

- Coal	38.7%
- Gas	18.3%
- Nuclear	17.1%
- Hydro	16.6%
- Oil	7.5%
- Others	1.8%



Thailand's dependence on natural gas → 80% of its electricity generation

- **Also, more stringent environmental regulations on SO_2 emissions → being promulgated in both public sectors (power generating facilities) and private sectors (industrial boilers)**

- **An effective approach to removing SO_2 from combustion exhaust gas → use of a FGD (*Flue Gas Desulfurization*) system**

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Typical Seawater

Major Constituent	*g/kg*
Cl^-	19.35
Na^+	10.76
SO_4^{2-}	2.71
Mg^{2+}	1.29
Ca^{2+}	0.41
K^+	0.40
HCO_3^-	0.14

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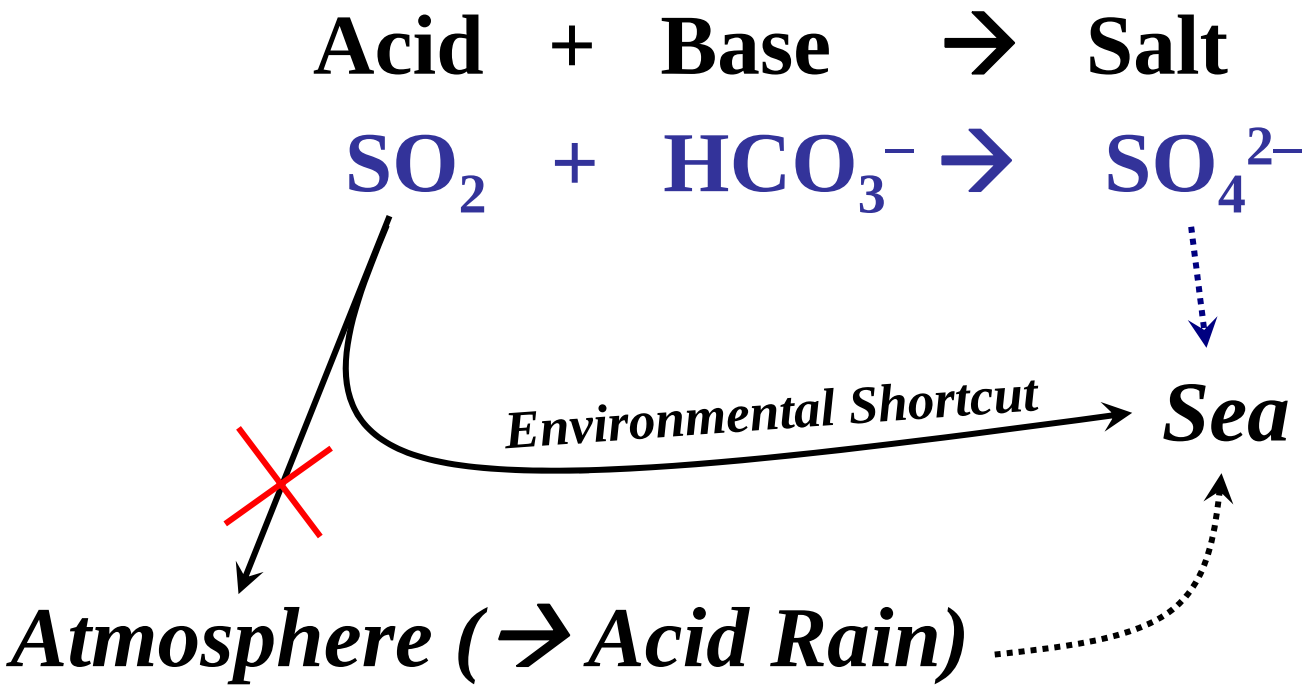
- **Seawater → used as a medium in the cooling system and basically having a pH value of 7.6-8.4 with an inherent alkalinity of approx. 100-110 mg/L as CaCO3 (in terms of CO_3^{2-} and HCO_3^-)**
- **Taking into consideration an amount of the sulfur (S) composition existing in seawater → <u>approx. 0.9 kgS pristinely present in every ton of seawater</u>**

How is it possible to remove SO_2 in the flue gas by the use of seawater and then return the seawater effluent to the seawater body?



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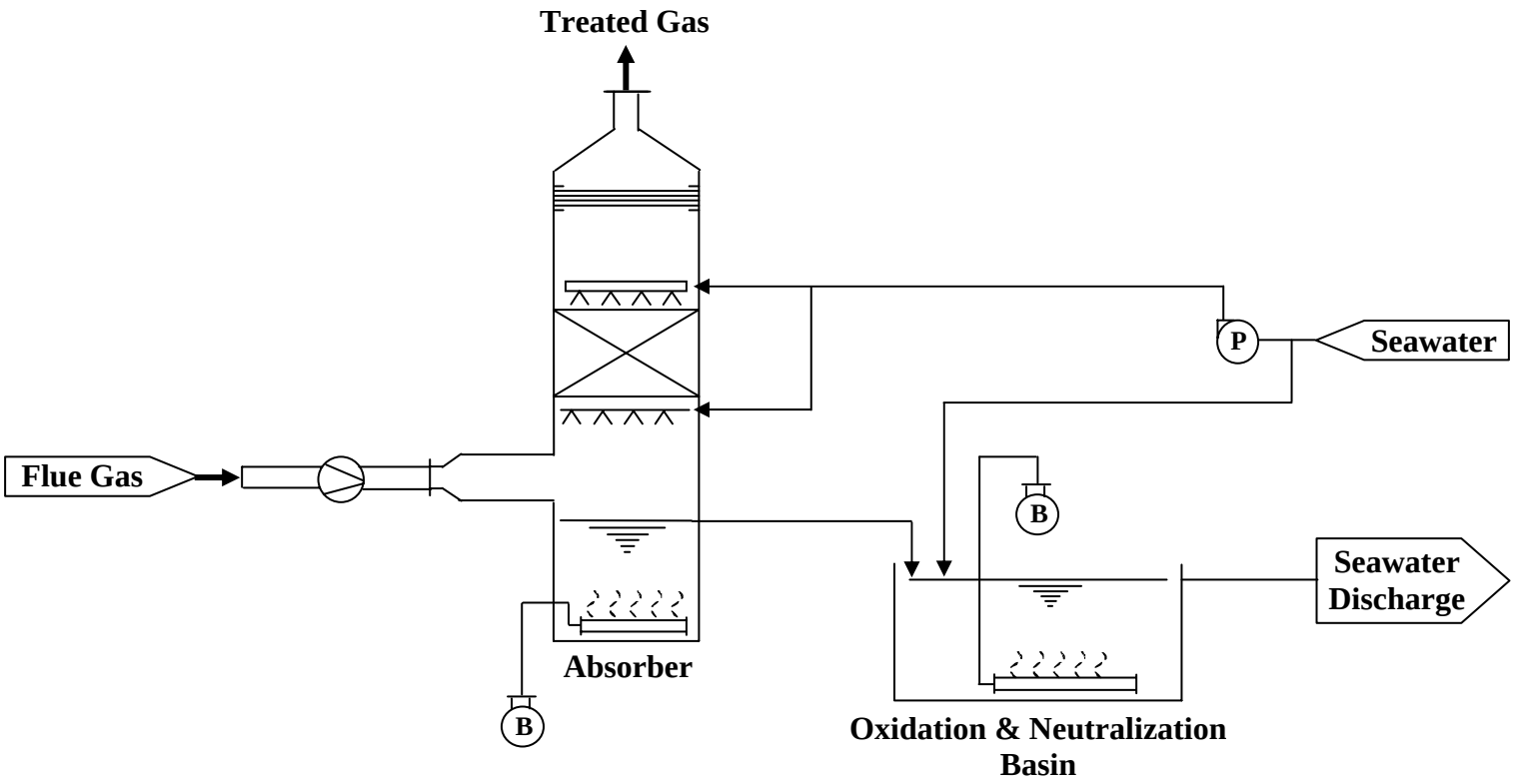
Simplified Schematic Diagram of Seawater FGD System



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Worldwide Statistics of Seawater FGD System

Practical Application	*MWe*
1998	*1,360* *(accounting for only 0.6% of the total FGD application)*
2004	*approx. 16,000*

Seawater FGD Application → **considered as a promising technology environmentally sound from an engineering point of view**

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◆ Wastewater-Related

Giving a benefit as another source of energy (in terms of CH_4) → upflow anaerobic sludge blanket (UASB) systems becoming more practically familiar in Thailand in both large scale and small scale

◆ Waste-Related

Harnessing energy by the use of agricultural residues (e.g., rice husk, bagasse, coconut husk and sawdust) → becoming more common nationwide

◆ FGD-Related

To put this technology in a more practice both in large-sized scale and small-sized scale → a fundamental framework

1) Dissemination (and communication) of accurate & practical information → necessary

2) Intervention of the government through the creation of stricter emission requirements and incentives contributing to the application & development

Thank You

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