

WTO Workshop  
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# *Air Pollution and Emission Control*

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# WTO Target

*A triple win outcome for trade,  
environment and development*

- Identification of environmental goods:
  - Air pollution control(APC): 13 entries---

➤ “Triple Win” is expected:

◆ *A win for trade---elimination of tariff and non-tariff barriers(NTBs)*

◆ *A win for environment---improving access to high quality environmental goods*

◆ *A win for development---liberalization of trade in environmental goods can stimulate innovation and technology transfer to developing countries*



# What are the serious air pollutions right now?

## Phenomena

- *Acid rain*
- *Photochemical smog*
- *Dust & Particulate Matters*
- *Ozone Layer*
- *Hazardous contaminants*
- \*\*\*\*\*
- *Greenhouse gases*

## Pollutants

- *SO<sub>x</sub> (Sulphur Oxides)*
- *NO<sub>x</sub> (Nitrogen Oxides)*
- *Dust & Particulate Matters*
- *Destruction of Ozone*
- *Mercury, etc.*
- \*\*\*\*\*
- *CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, etc.*

# Acid Rain

◆ “Acid Rain” ( $\text{pH} < 5.0$ ) is caused by high concentration of  $\text{SO}_x$  (Sulphur Oxides) and  $\text{NO}_x$  (Nitrogen Oxides).

◆ Damage:

- Death of forest.
- Death of fish in ponds and lakes.
- Asthma

◆ Countermeasure :

$\text{SO}_x$  and  $\text{NO}_x$  emissions from stationary and non-stationary sources. Highly efficient De $\text{SO}_x$  (Sulphur Removal System) and De $\text{NO}_x$  ( $\text{NO}_x$  Removal System) are now available.



<http://www.nationalgeographic.co.jp/environment/global-warming/acid-rain-overview.html>



# Photochemical Smog

◆ “Photochemical Smog” is caused by high concentration of  $\text{NO}_x$  plus  $\text{O}_3$  with the acceleration by sunlight.

◆ Damage :

Damage to human body, such as eye-sore, disorder of aspirating organ.

◆ Countermeasure :

To reduce  $\text{NO}_x$  emissions from stationary and non-stationary sources. De $\text{NO}_x$  System can effectively reduce  $\text{NO}_x$  emissions.



# *Dusts and Particulate Matters*

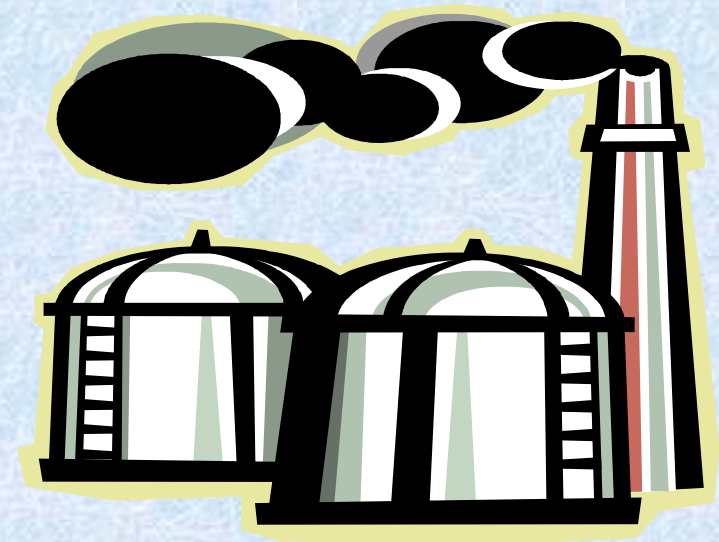
◆ Dusts and Particulate Matters are emitted from power stations, small furnaces and automobiles, mainly due to insufficient combustion.

◆ Damage :

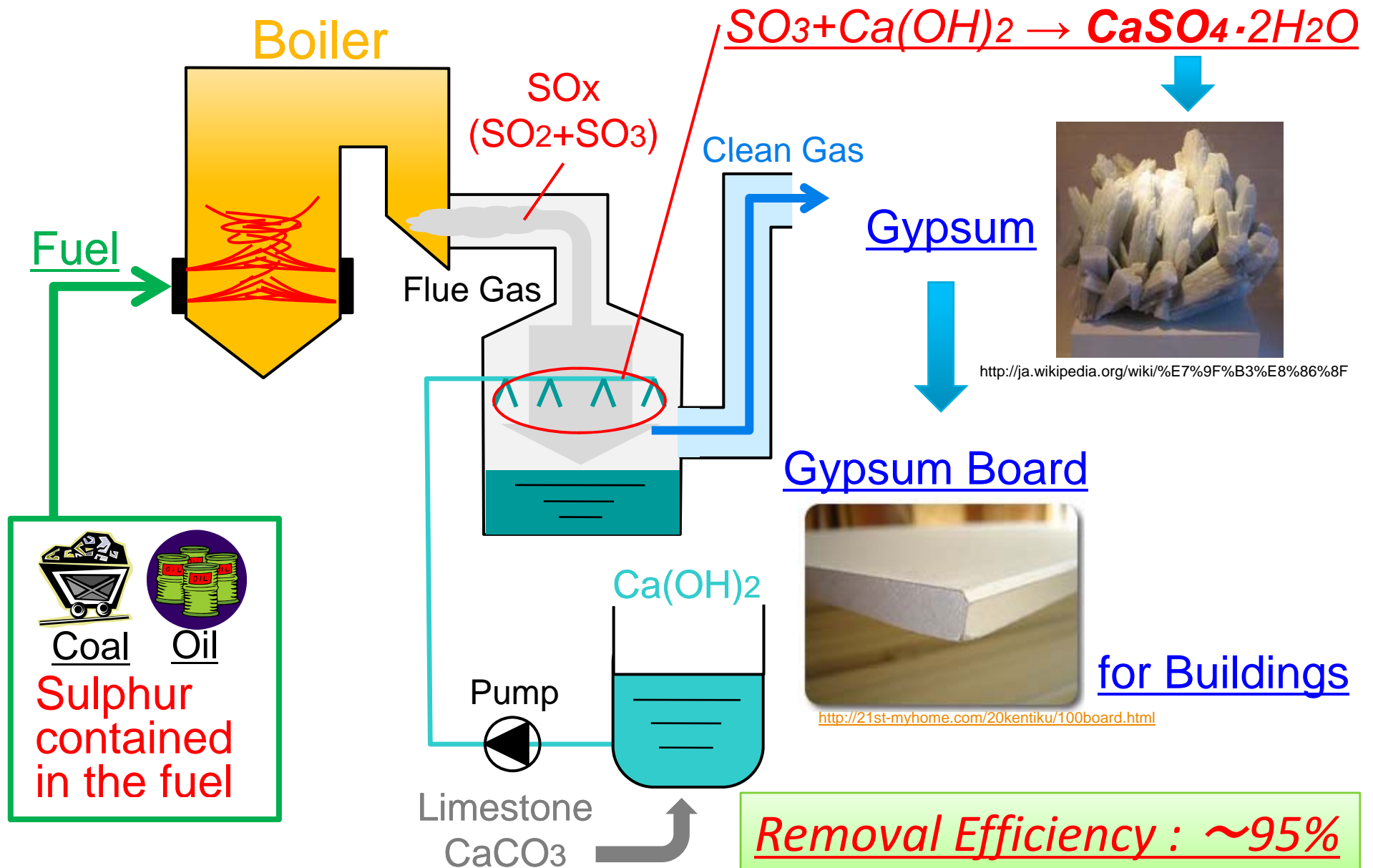
Contamination of air and make the environment dirty. Health damage to human body, esp. aspirating organ.

◆ Countermeasure :

Efficient Dust Removal Systems are available and can reduce emissions.



# DeSOx (Sulphur Removal) System

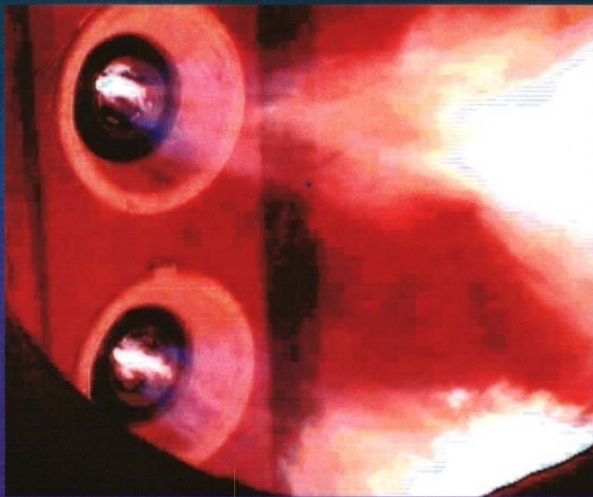




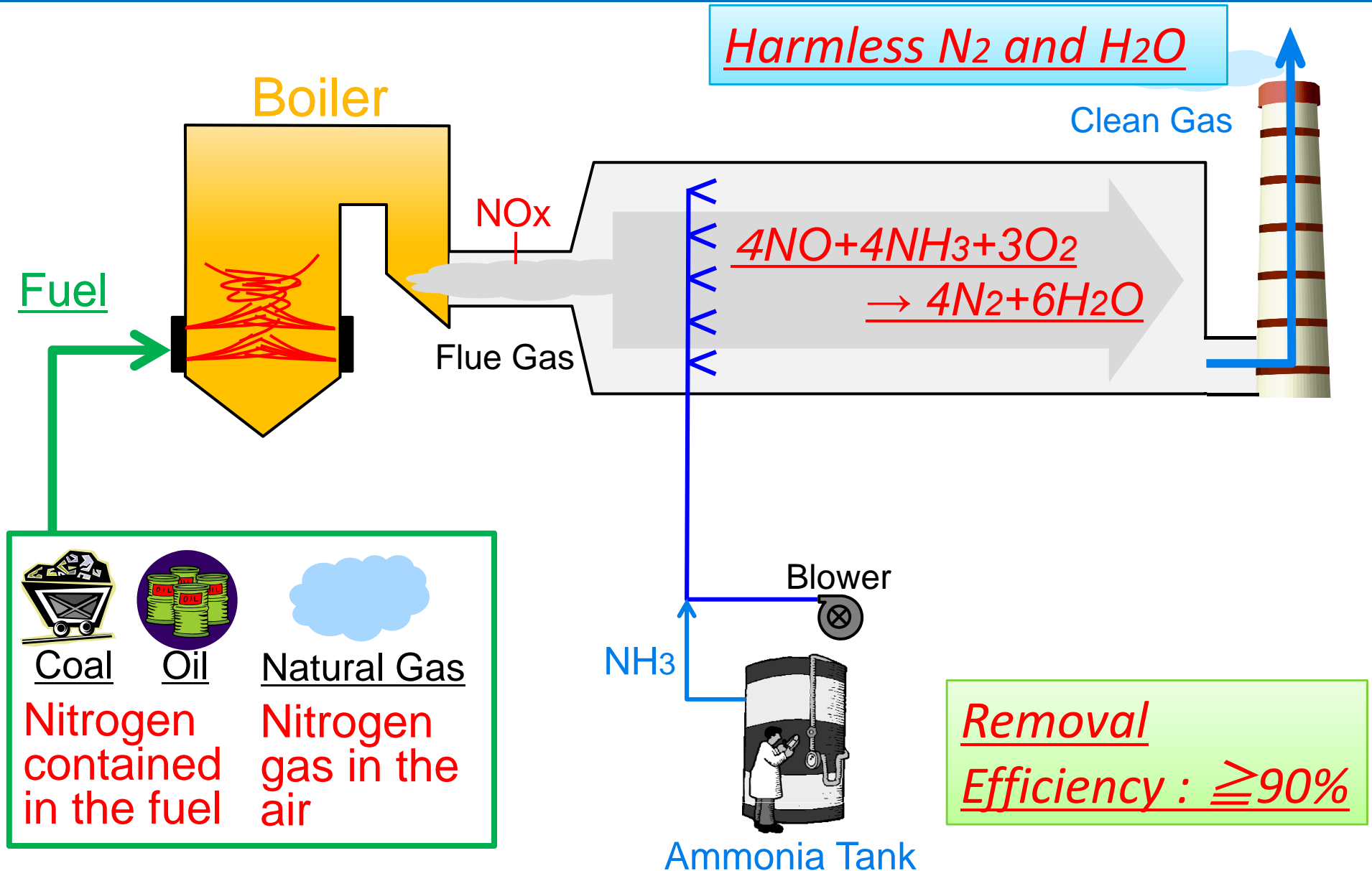
# *NOX REDUCTION TECHNOLOGIES*

## DeNOx System:SCR (Selective Catalytic Reduction)

### Low NOx Burners



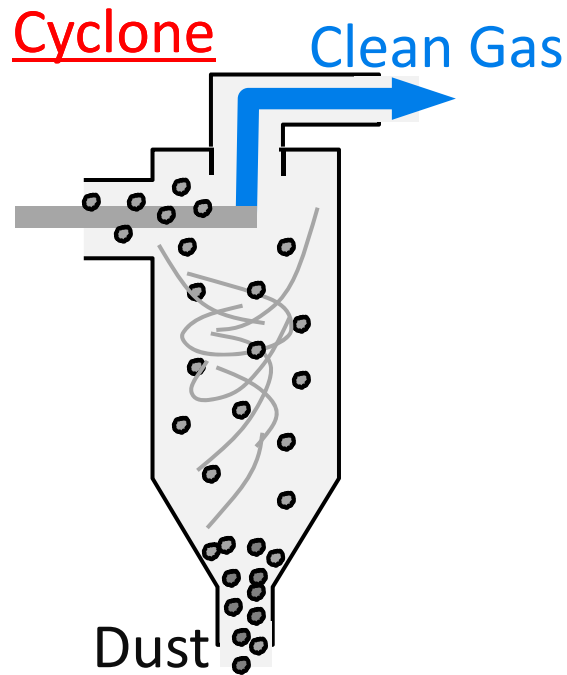
# DeNOx (NOx Removal) System





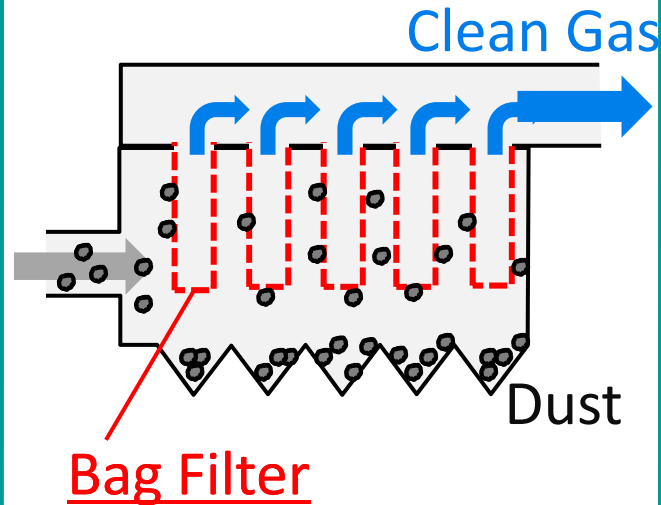
# Dust Removal Systems

## Mechanical



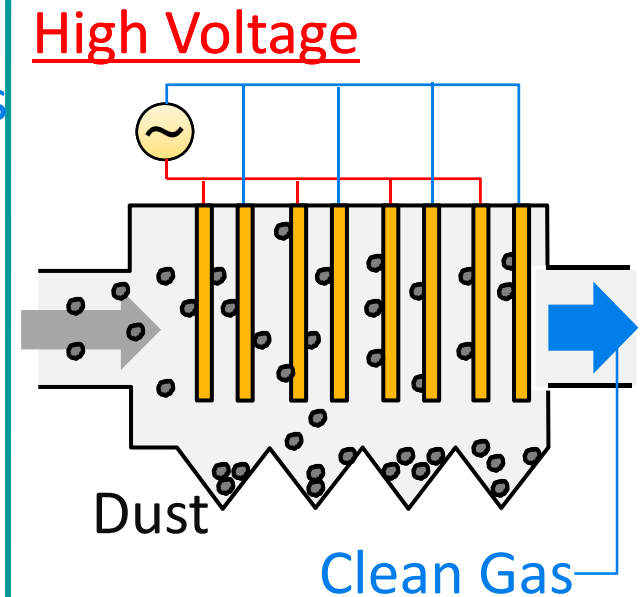
Removal Efficiency  
: ~ 90%

## Bag Filter



Removal Efficiency  
: ~ 99%

## Electrostatic Precipitator



Removal Efficiency  
: ~ 99%



## Intrinsic Barriers to Air Pollution Control

A. Private companies tend to be reluctant to adopt Air Pollution Control Equipments, **because.....**

① *They don't increase production.....*

② *They don't make profits.....*

③ *They need money and manpower to operate and maintain.....*

B. Regulation is necessary to prevail

C. Efforts are necessary to encourage transfer to required countries



# Energy Efficient Products

(Consumer Products)

**Simple**

[http://www.xikit.com/store/index.php?main\\_page=product\\_info&products\\_id=2](http://www.xikit.com/store/index.php?main_page=product_info&products_id=2)



LED light

LCD TV



PC

ECO-Cars



**Maintenance-free**

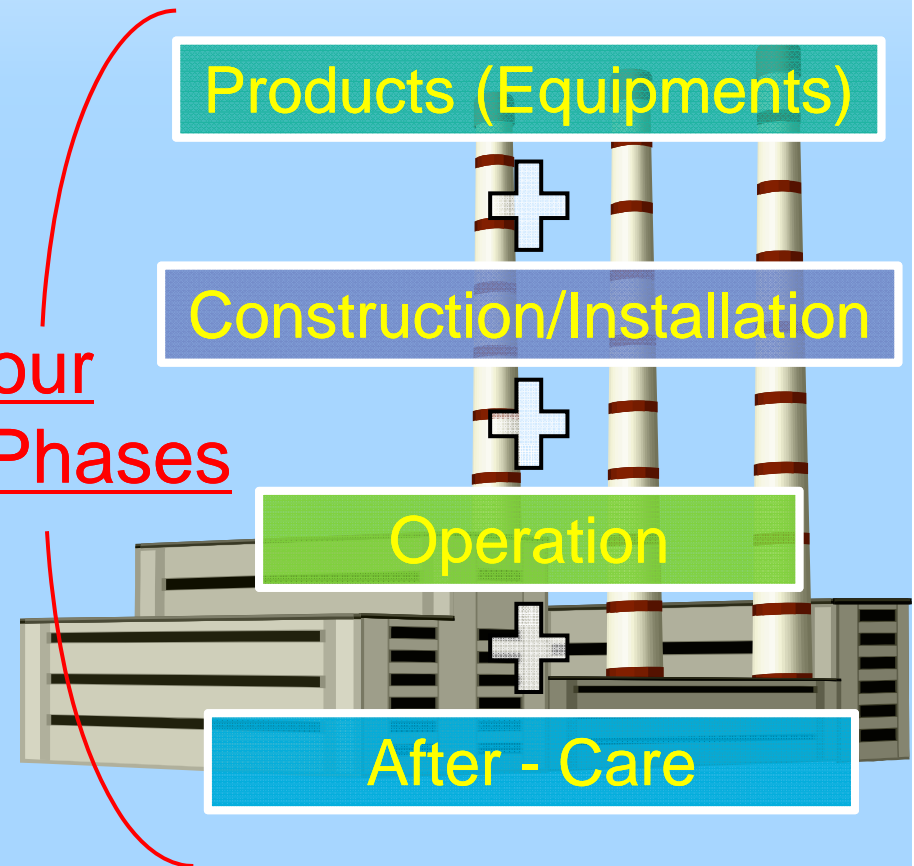


# Air Pollution Control Systems

(Equipments and Plants)

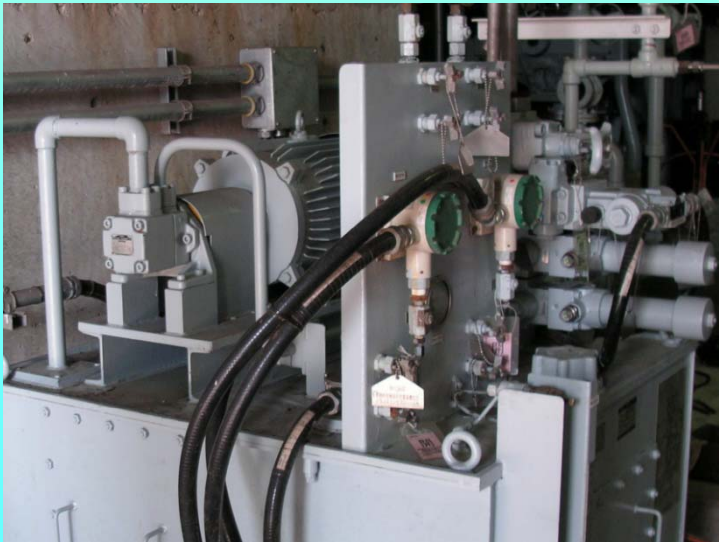
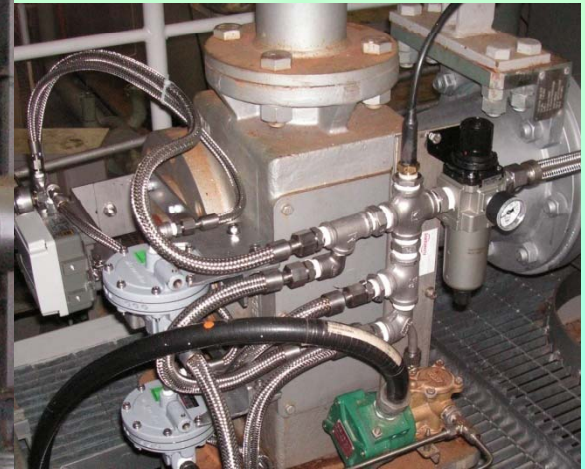
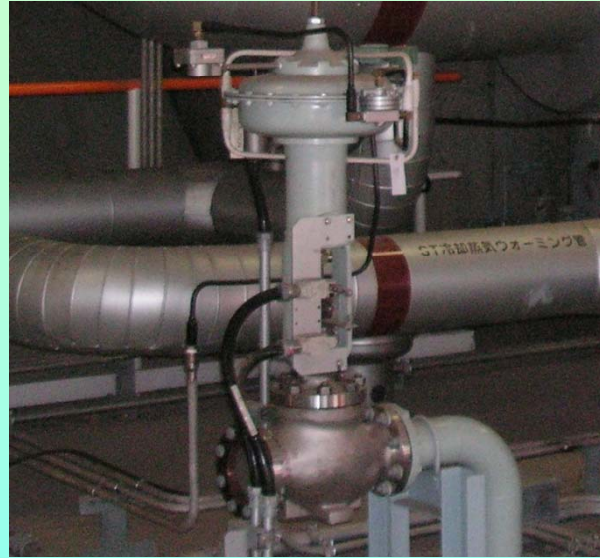
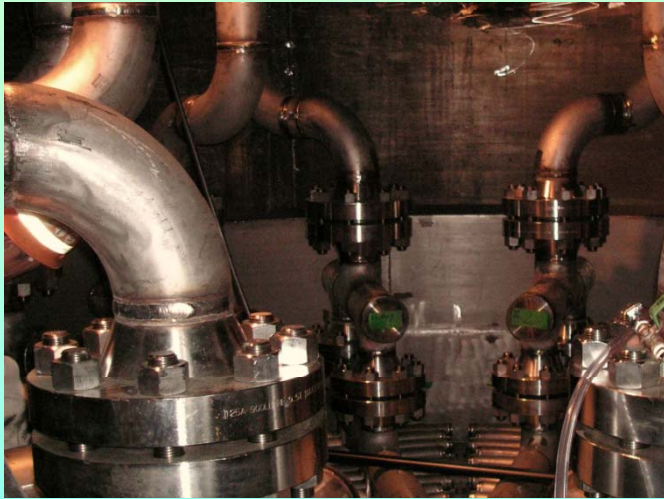
**Complicated**

Four Phases



*It is important to discuss on the components, but.....*

*(Most of the present entries are components.....)*





*Actual plant is very complicated!  
Assembly of hundreds of components!*



*The plant must be operated as a whole system!  
Otherwise it will not function!*

*Operation Training is  
Also very important!*



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# Technology Package is Necessary

Equipments



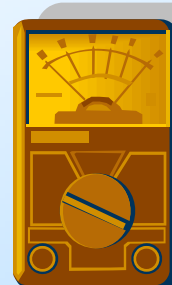
Operation Training



Maintenance Technology



Spare Parts Supply





## Special important considerations

➤ The separation of services and goods in environmental activity is difficult, because they are often integrated!  
---a parallel linkage between goods and services is necessary.

➤ Air pollution control equipments do not increase production, do not increase profits, they even increase operation and maintenance costs.  
---for actual application, REGULATION is necessary, and financial supports are recommended.

## Conclusion

- ◆ Integrated approach is very important for successful technology transfer of air pollution control.....

### Goods

- Design & Engineering
- Manufacturing
- Construction

### Services

- Operation
- Maintenance
- Spare Parts

Support in full package is important!



A tropical beach scene with turquoise water, white clouds, and a blue sky. The water is clear and shallow, showing some seabed details. The sky is a deep blue with scattered white clouds. The overall mood is serene and peaceful.

*Thank you!*

*The End*