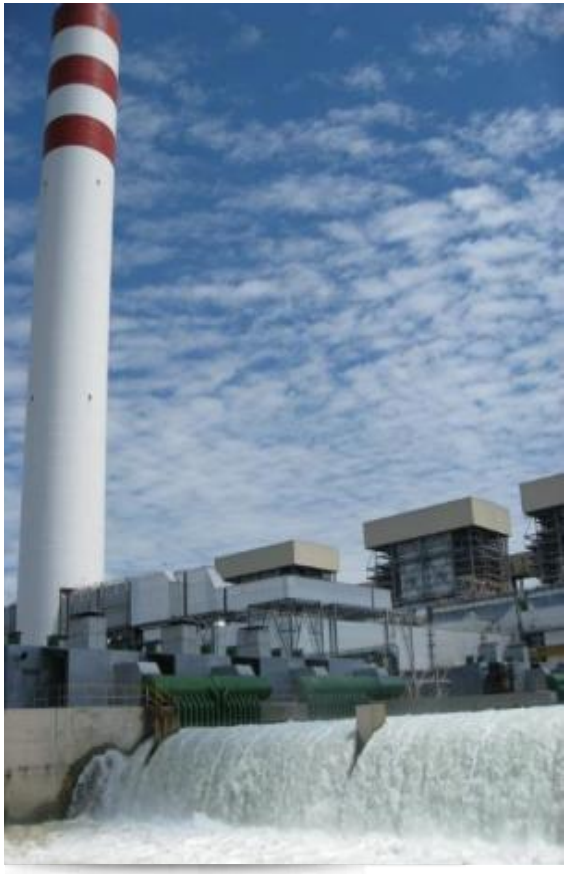
# Seawater Flue Gas Desulphurisation – (SWFGD)



- Pioneer in SWFGD with 1st installation in 1968
- 50+ GW in Power alone
- Proven experience with 1,000 MW unit
- Unique packed tower design
- No reagent and no by-product, with superior restoration quality of discharged seawater

**Reduce Cost of Electricity**

- Lower power consumption resulting from packed tower design
- No additional cost for reagent and end-product disposal
- Lower maintenance cost

**Lower Environmental Footprint**

- > 98% SO2 removal demonstrated
- Up to 4.5% Sulphur in Heavy Fuel Oil (HFO)

**Increase Flexibility & Reliability**

- Largest fuel flexibility, including coal, HFO and industrial flue gas
- Robust design without nozzles, leading to high reliability

NO.1 in SWFGD with ~60% of installed base globally



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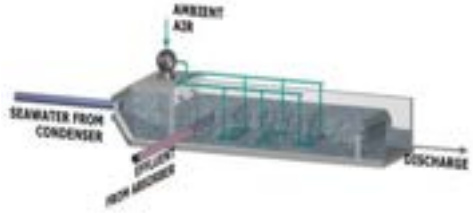
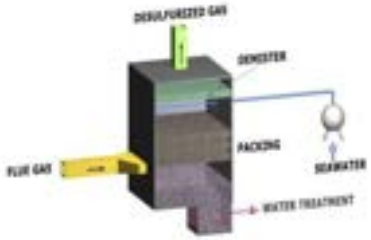
# SWFGD Chemical Process

From Seawater

$H^+ + HCO_3^- \leftrightarrow CO_2 + H_2O$
(neutralisation)

$SO_2 + H_2O \leftrightarrow SO_3^{2-} + 2H^+$
(absorption)




(oxidation)
$SO_3^{2-} + ½O_2 \rightarrow SO_4^{2-}$

From Air

$CO_2$
$H_2O$
$SO_4^{2-}$

$SO_4^{2-}$ (Sulfate), already present in Seawater (typical 2.7kg/m3)

$CO_2$ emissions negligible vs stack emissions

- Recycles sulfur back to its original location in its original form
- Only seawater and air are used
- No waste handling is needed



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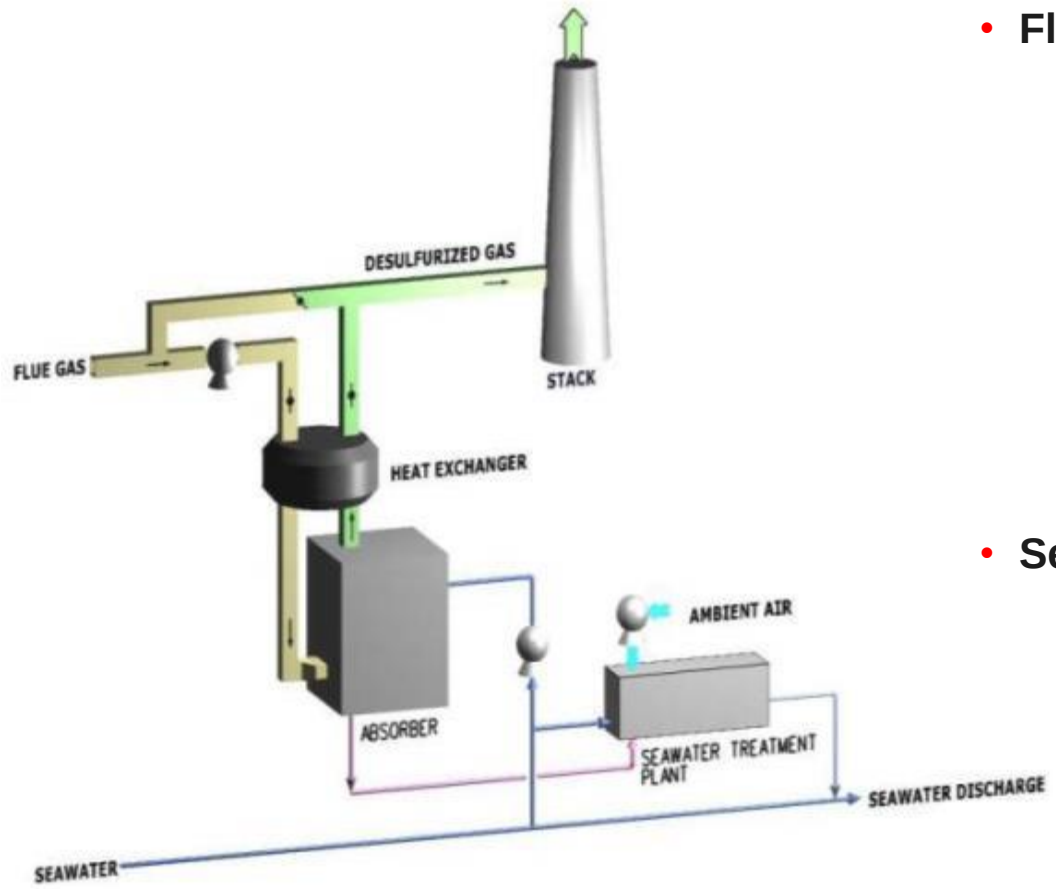
# SWFGD Process Flow




- **Flue Gas Path:**
  - De-dusted flue gas pass through booster fan (if required) before entering into GGH
  - Flue gas cooled down by GGH is scrubbed with counter-current seawater in absorber
  - Clean flue gas is reheated by GGH before exhausted through the stack
- **Seawater Path:**
  - Part of the spent cooling water is pumped into the top of the absorber
  - Effluent seawater is mixed with the remaining fresh spent cooling sea water and treated in Seawater treatment Plant

## Simple & Efficient System



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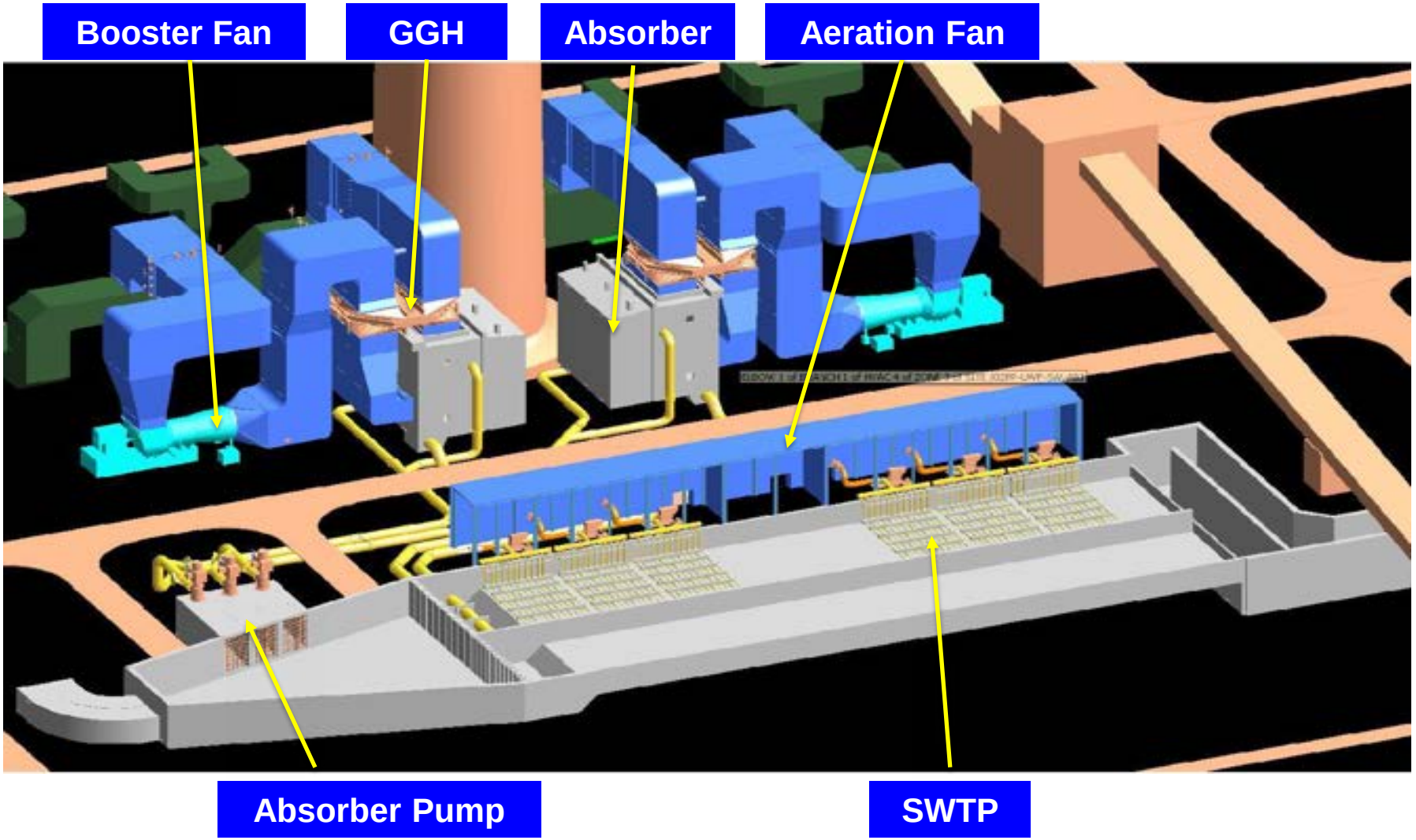
# Alstom SWFGD 3D Layout



# Absorber
# Concrete Work and Packing

Seawater piping inlet

Absorber inlet



Compact design, easy construction and maintenance



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# Key Benefits of Alstom SWFGD

1. Up to 99% removal efficiency
2. Superior restoration quality of seawater for discharge
3. Low consumption of power
4. No chemicals or additives needed for pH recovery
5. No by-product
6. Optimized footprint
7. Reliable and easy operation
8. Simple and low maintenance
9. Global market leader with >40 years experience

## Meeting most stringent regulations with minimized cost



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