



Technology and Application of Absorption Chillers

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0. Introduction of Kawasaki

1. What's Absorption Chillers?

2. Triple Effect Absorption Chiller – the highest efficiency

3. Solar Cooling Application



Kawasaki



Kawasaki Shipbuilding Corporation

Rolling Stock & Construction Machinery

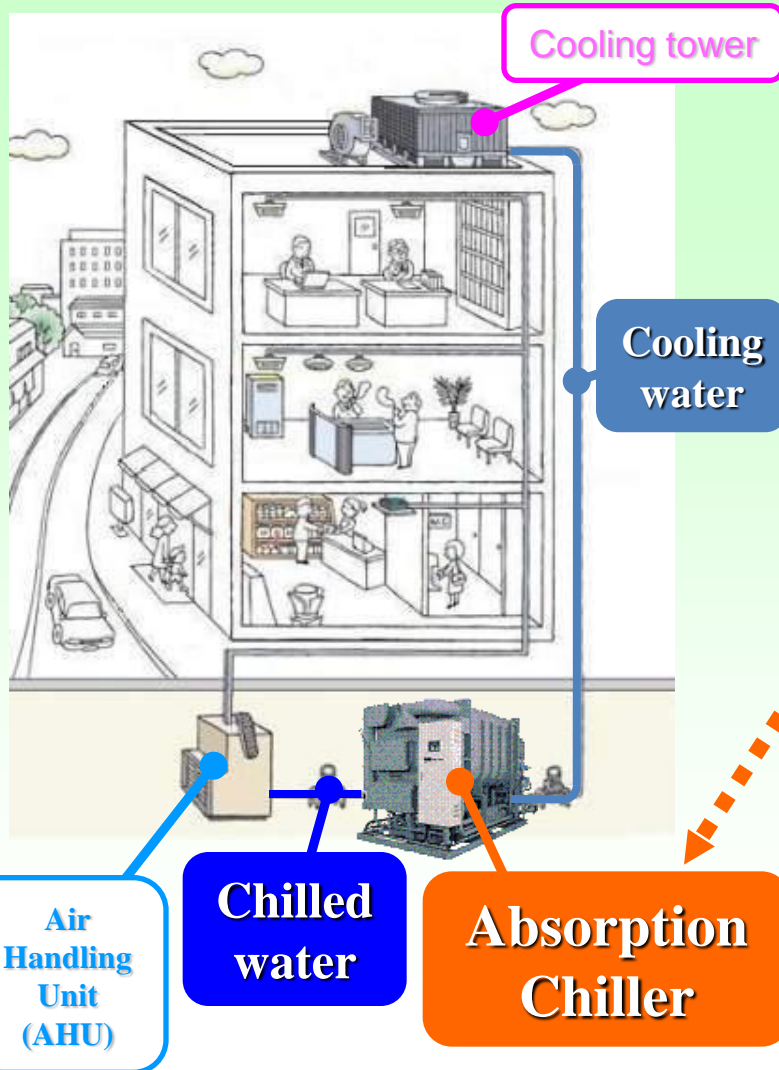
Aerospace

Gas Turbine & Machinery

Consumer Products & Machinery



Kawasaki Thermal Engineering Co., Ltd.



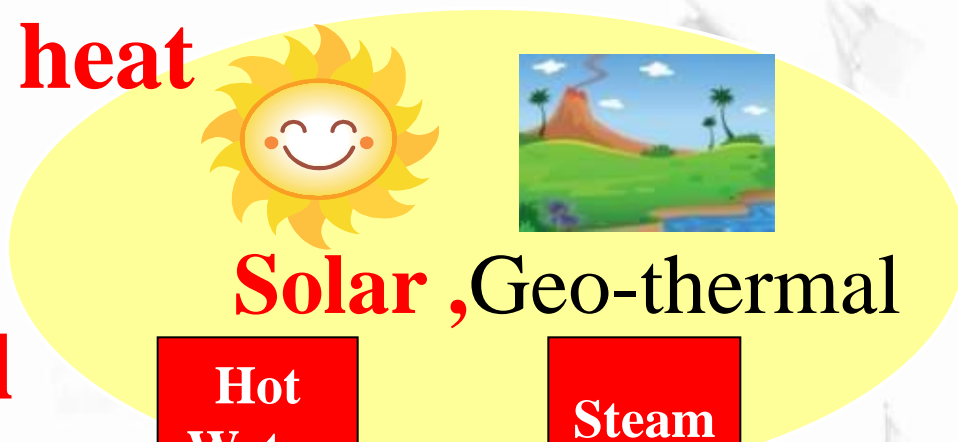
★ Special Feature



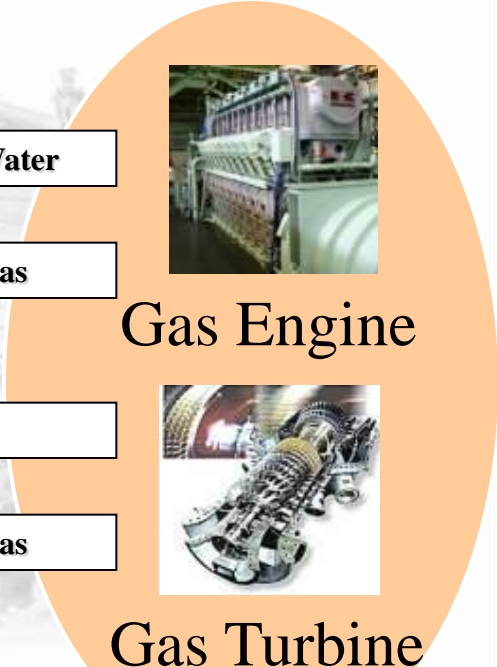
- ① **Freon-Free air conditioning machine
(Refrigerant = Water)**
- ② **Much less power consumption than electric chiller.**
- ③ **Various Energy Sources can be utilized.**



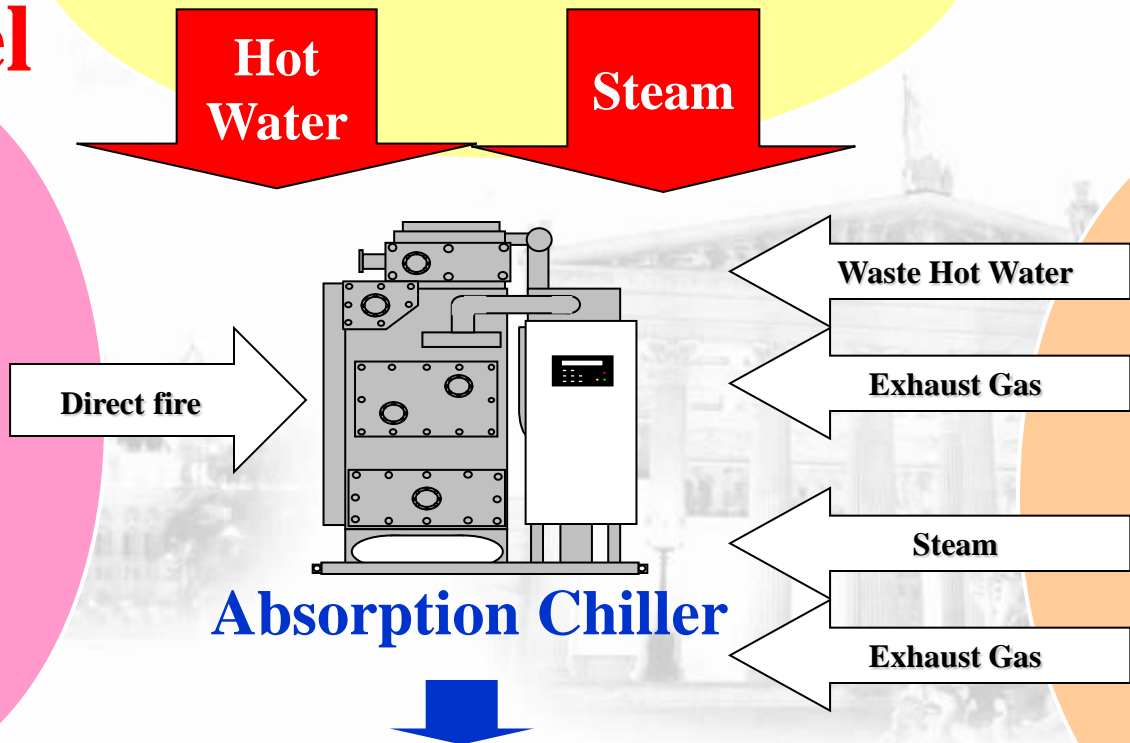
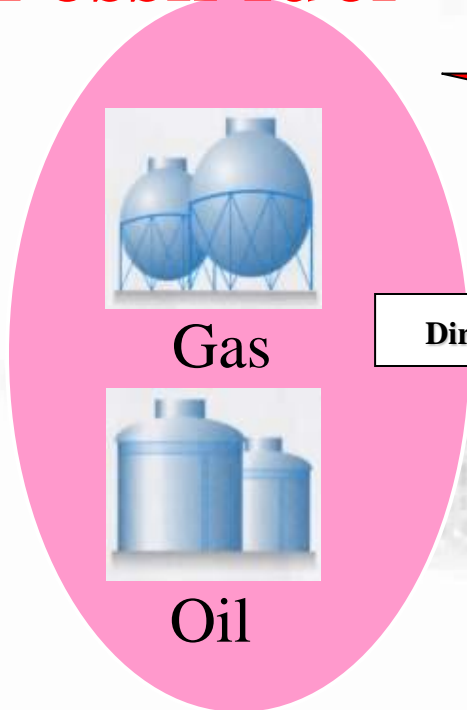
Natural heat



Exhaust heat



Fossil fuel



Chilled Water

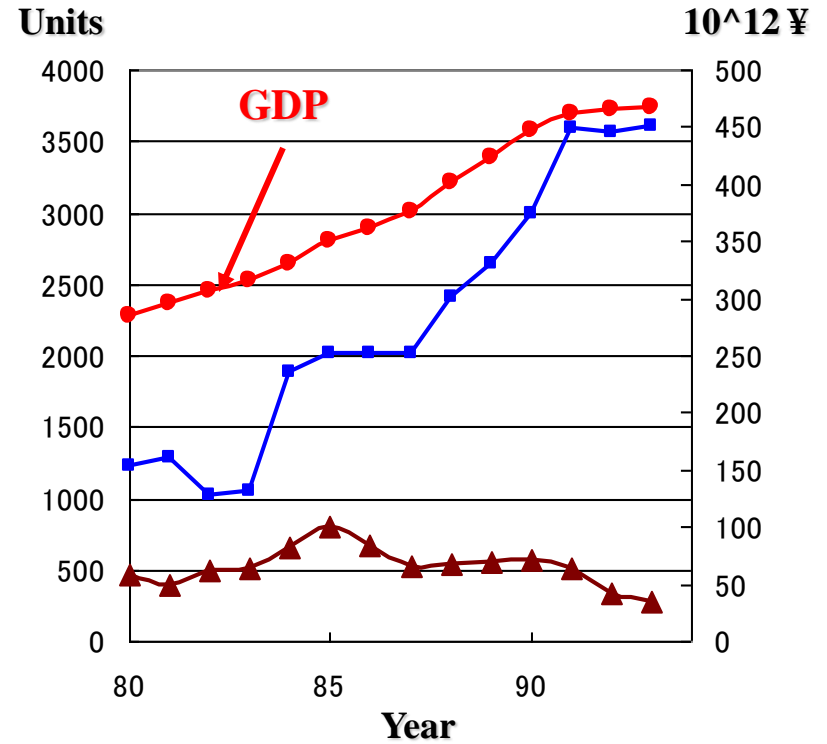
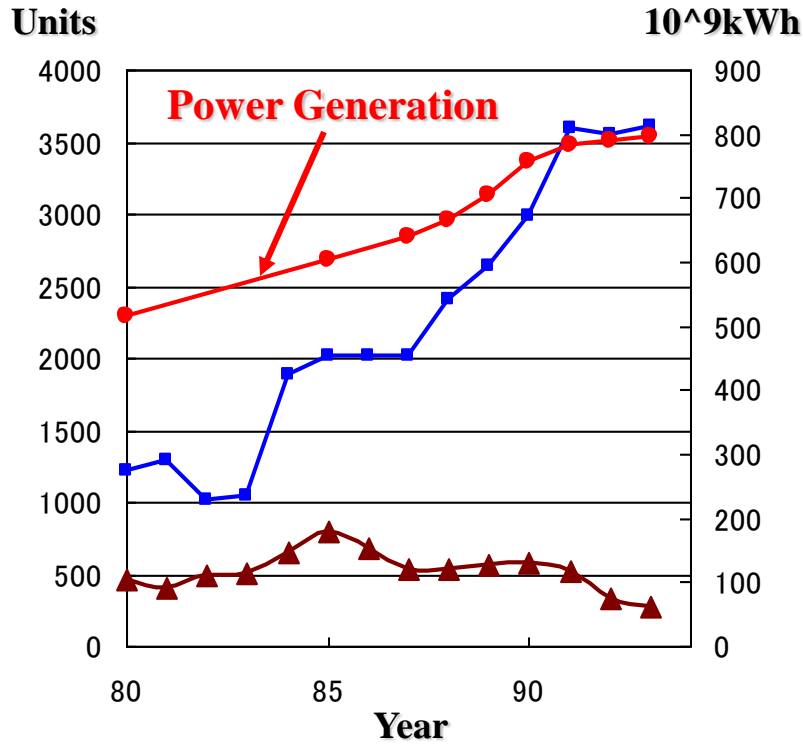


#1

What's Absorption Chillers?

Trend of Absorption Chiller in Japan

— Absorption Chiller
— Centrifugal Chiller

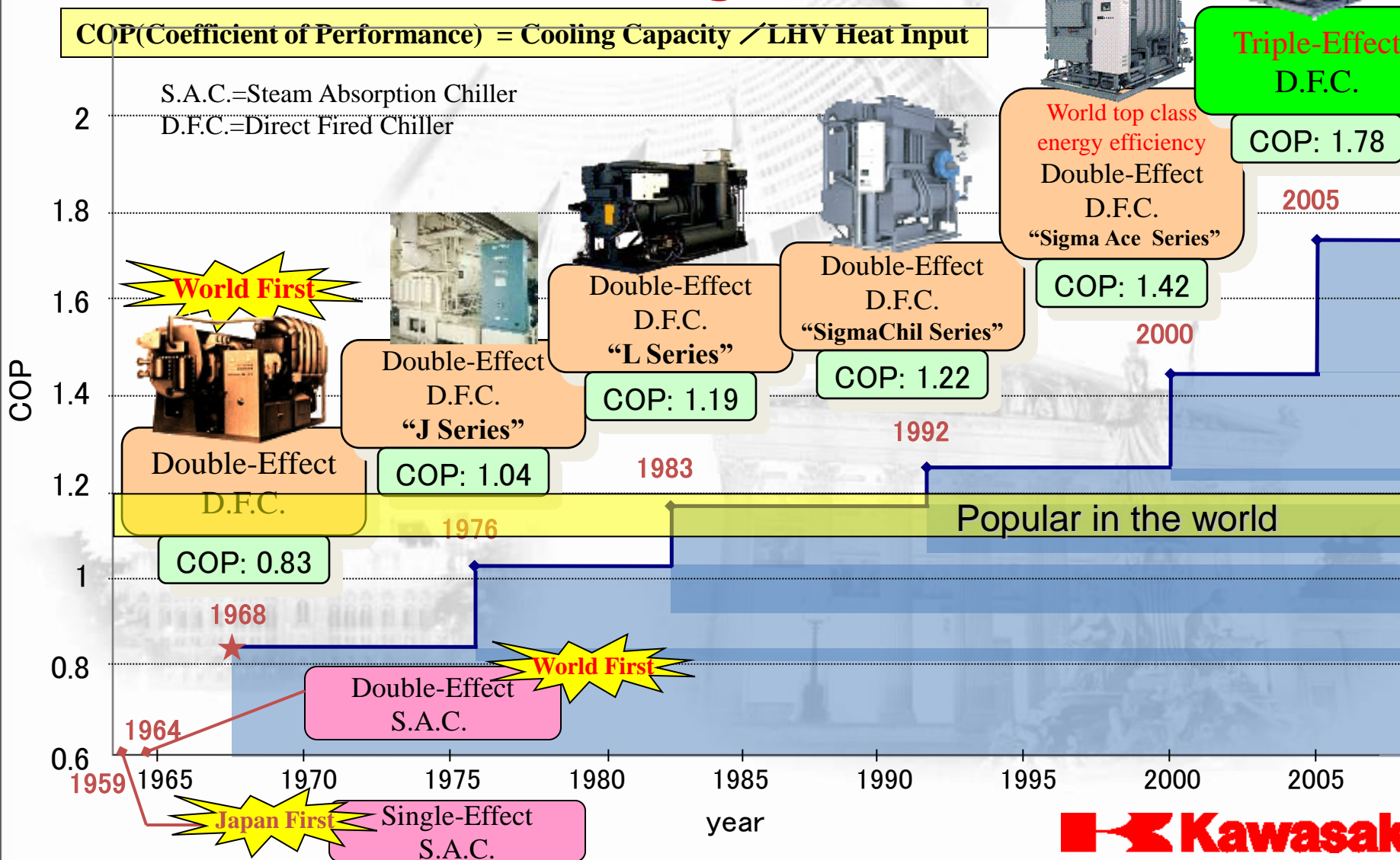




Continuous Efforts for Higher COP

$COP(\text{Coefficient of Performance}) = \text{Cooling Capacity} / \text{LHV Heat Input}$

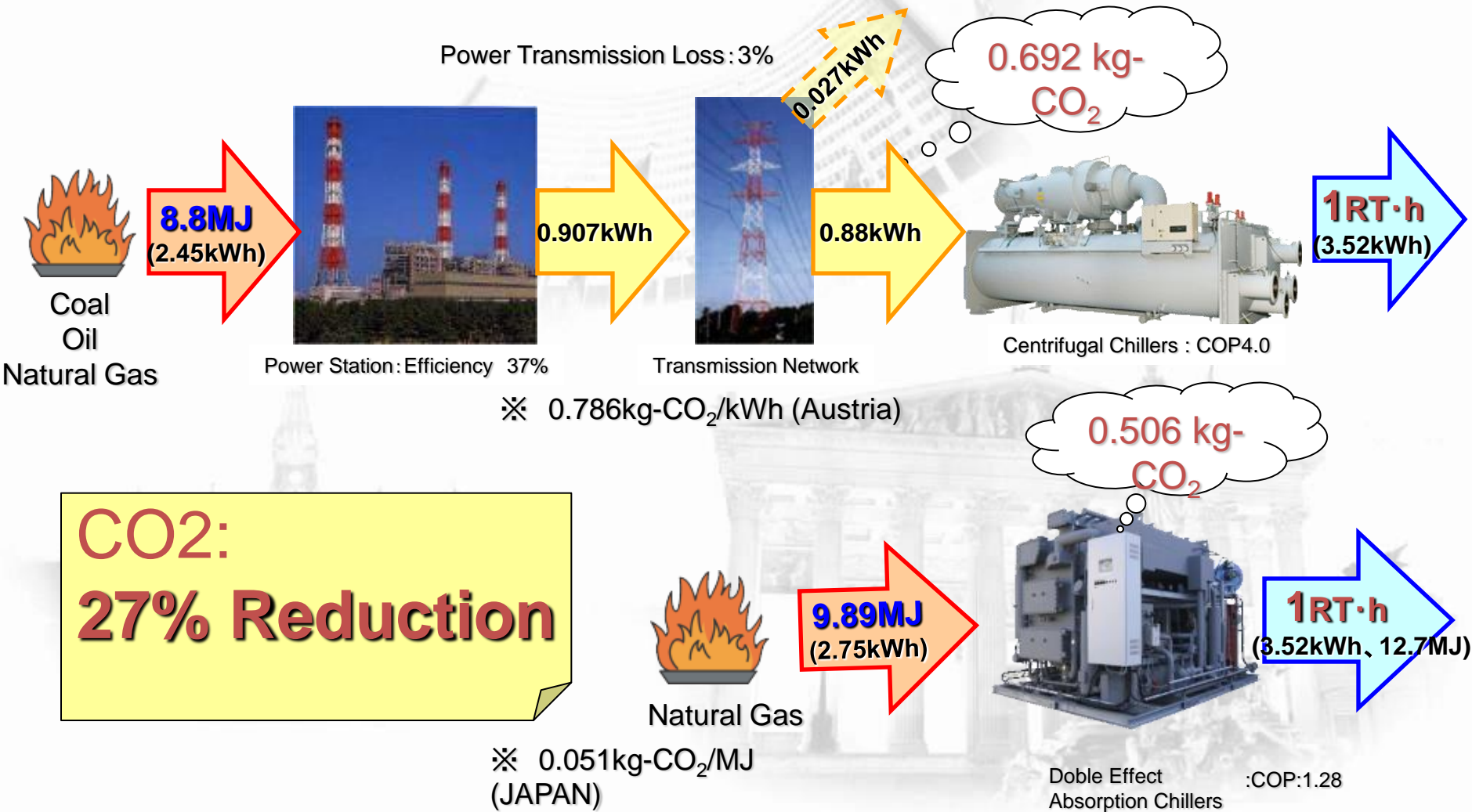
S.A.C.=Steam Absorption Chiller
D.F.C.=Direct Fired Chiller





What's Absorption Chillers?

Advantage of Double Effect Absorption Chillers

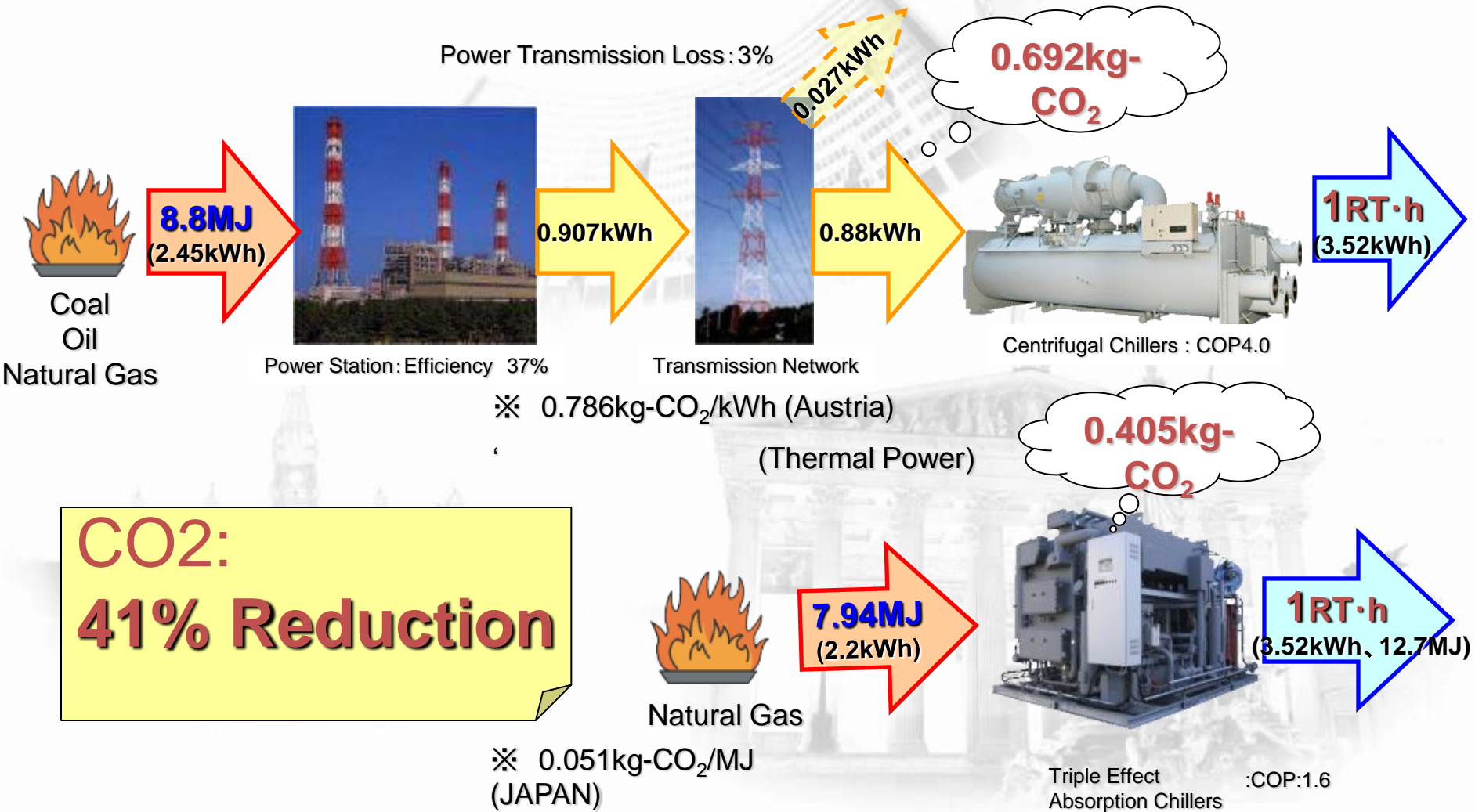




#2

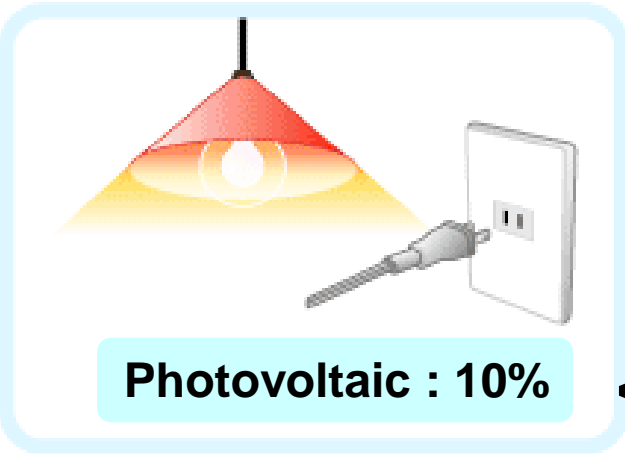
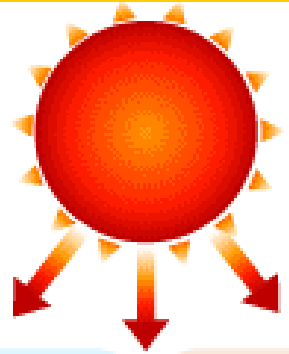
Triple Effect Absorption Chiller – the highest efficiency

Advantage of Triple Effect Absorption Chillers

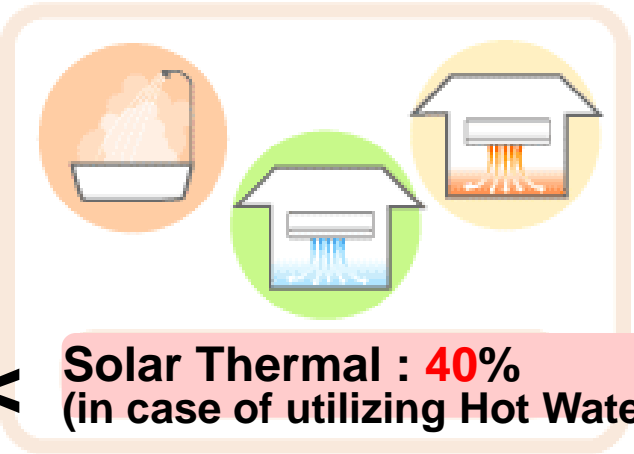


The efficiency of Solar Thermal is better than that of Photovoltaic.

Efficiency of Solar Energy



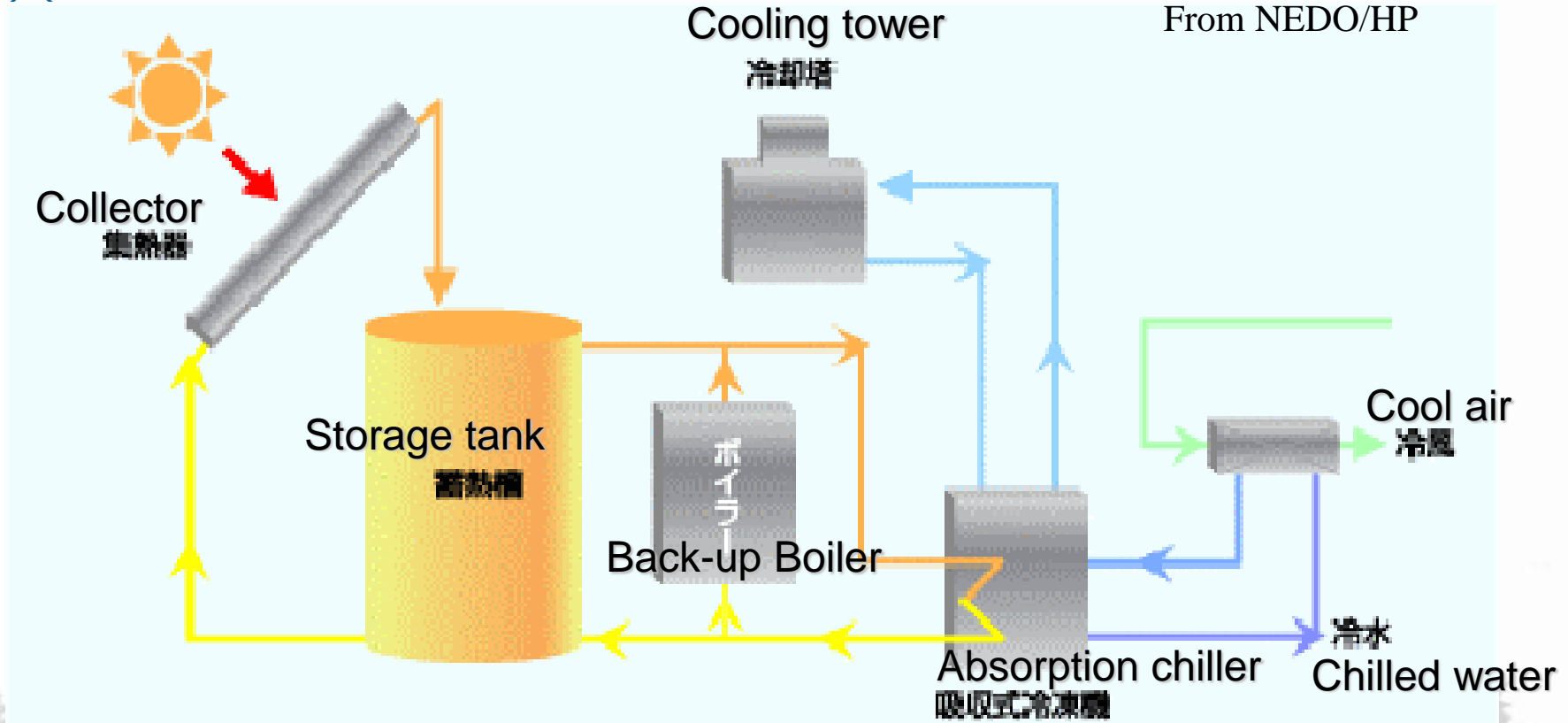
Photovoltaic : 10%



Solar Thermal : 40%
(in case of utilizing Hot Water)

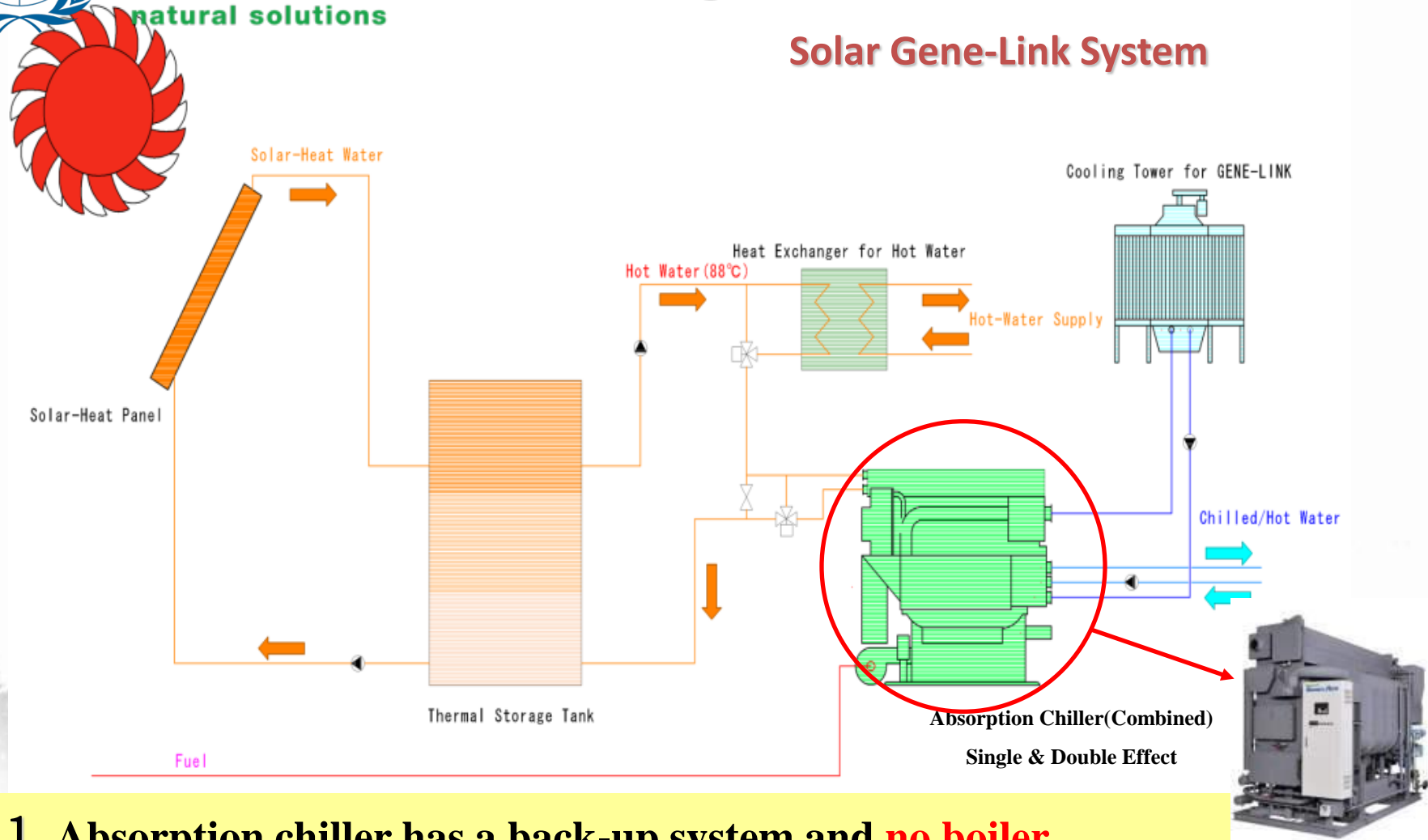
Conventional System

From NEDO/HP



1. Complicated system with a boiler for the **back-up** of hot water supply
2. Complicated **control system** to adjust hot water supply in accordance with the fluctuation of load and solar heat
3. Low efficiency of absorption chiller(**single effect**) **Kawasaki**

Solar Gene-Link System



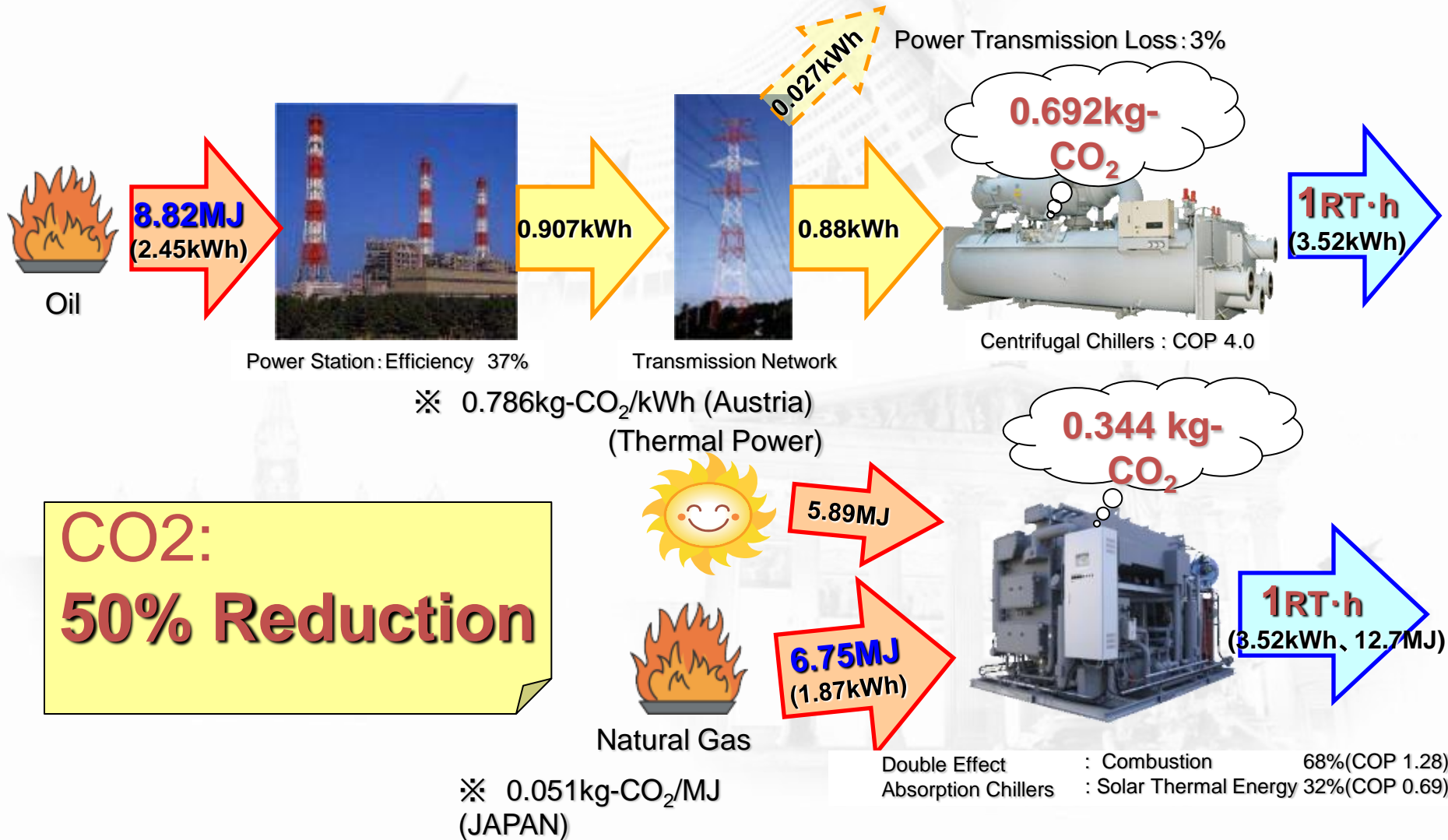
1. Absorption chiller has a back-up system and **no boiler**
 2. Absorption chiller is **automatically** moved to combustion for the **stable**
 3. **supply** of chilled water
- High efficiency of absorption chiller (**Double Effect**)

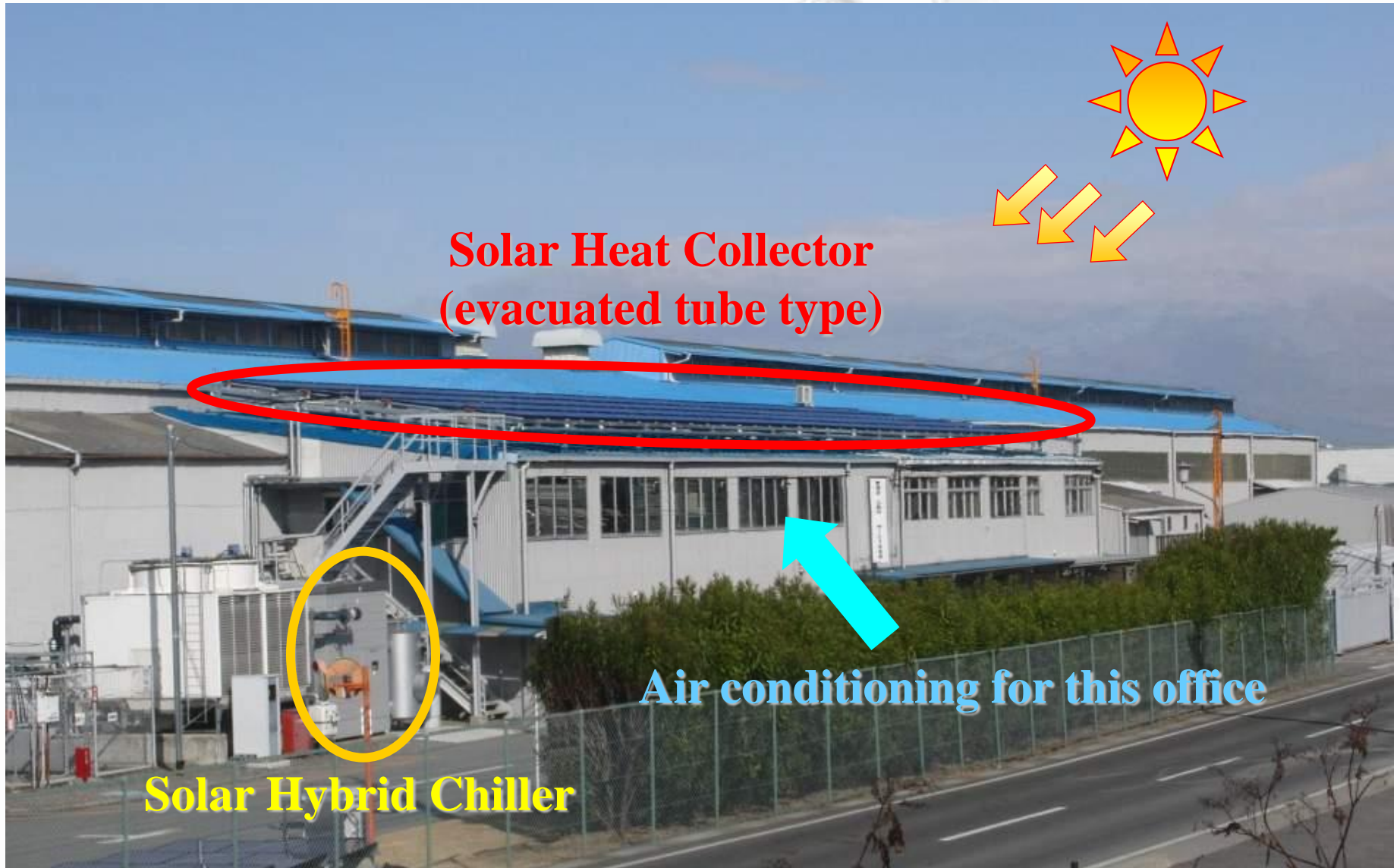


#3

Solar Cooling Application

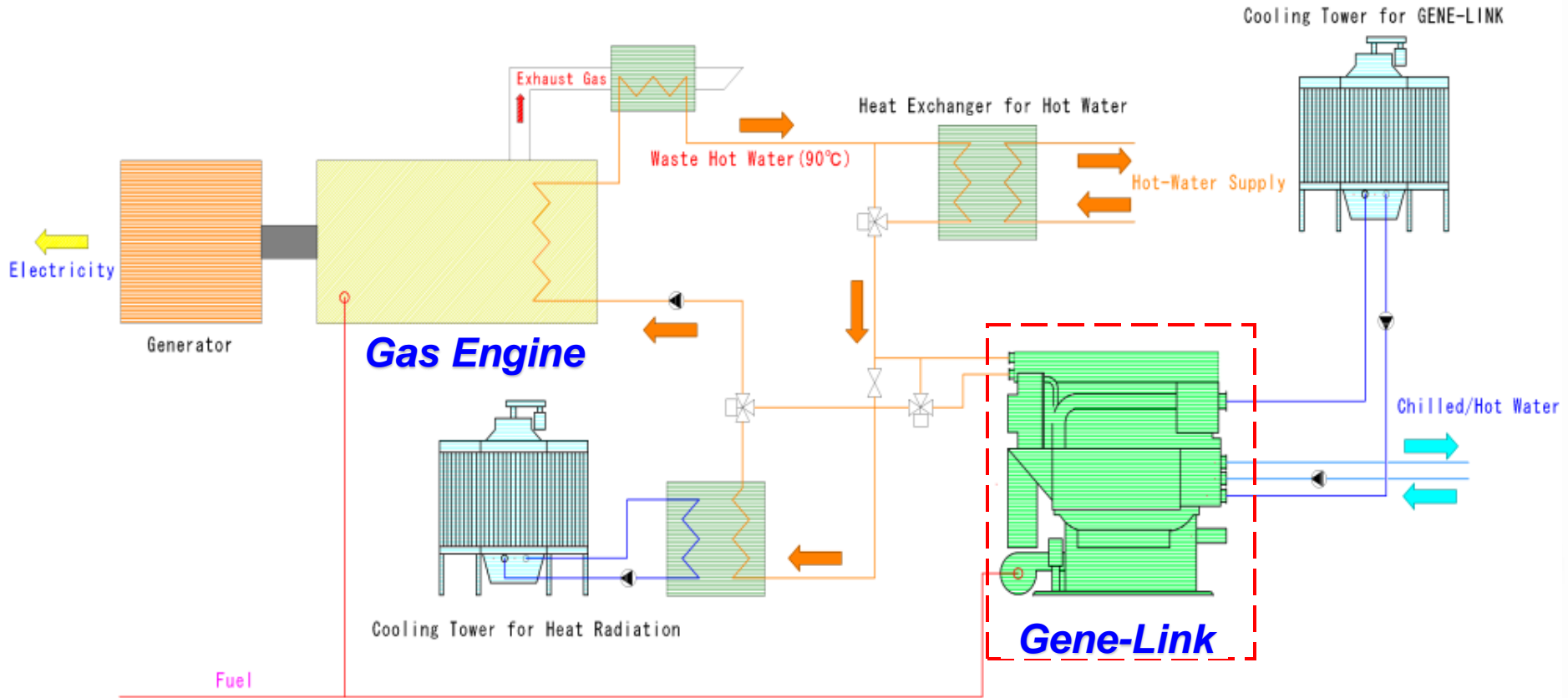
Advantage of Solar Double Effect Absorption Chillers







#3 Solar Cooling Application with Gas Engine





Thank you very much for your attention

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