

Technical Cooperation for Oil-Producing Country

MASATOSHI SAWADA

**DIRECTOR & GENERAL MANAGER
REFINING & TECHNOLOGY DEPT.**

[The Cosmo Oil Group's Management Vision]

Harmony and Symbiosis

- ~ with Global Environment
- ~ between Energy and Society
- ~ between Companies and Society

for sustainable growth towards a future

Together with . . .

Global Communities

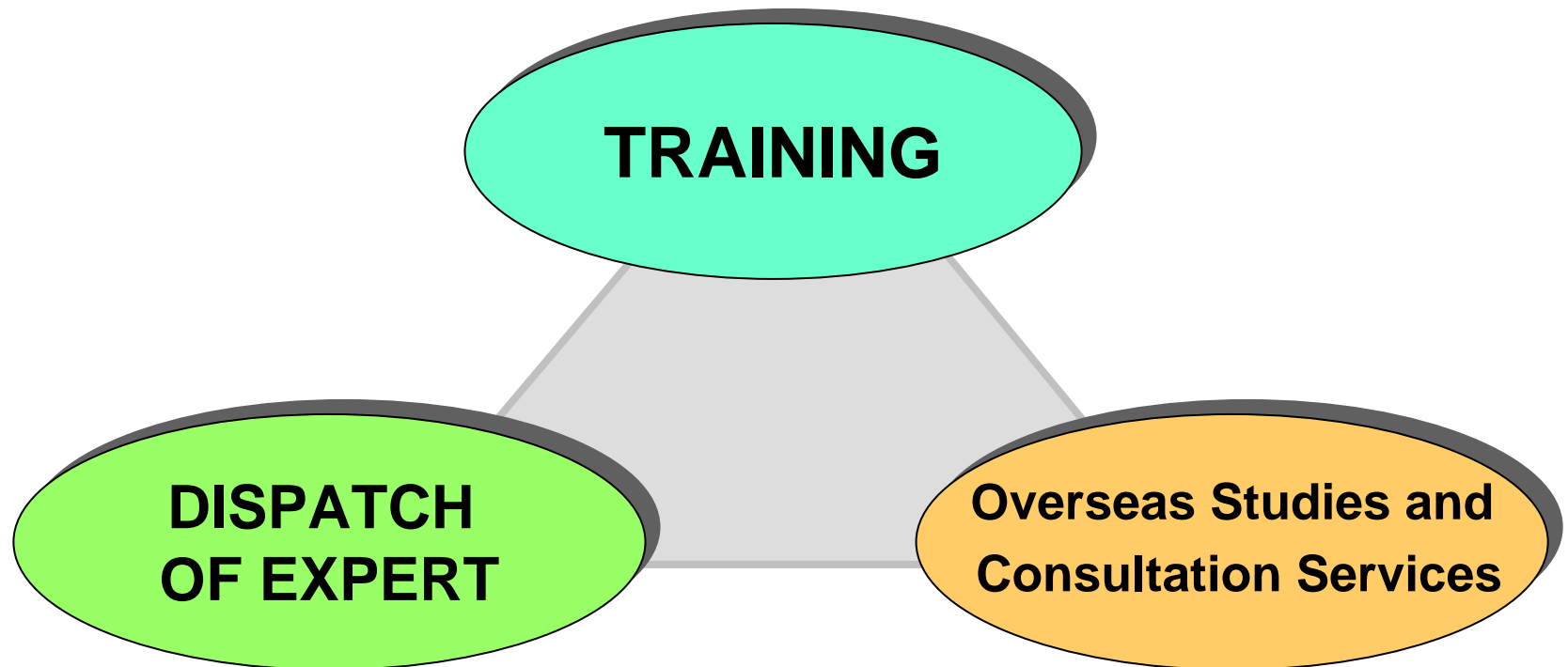
Employees

Customers



Promoting international cooperation through technical support and environment protection activities

Our main activities are the implementation of technical assistance for various development and research projects and energy conservation model projects.



We have been providing technological and managerial services at home and abroad at the request of oil producing country in such fields as follows.

- * Management business Administration
- * Demand forecast & Product Planning
- * Marketing & Distribution
- * Plant Operation & Maintenance
- * Quality Control & Laboratory Management
- * Environment & Safety Management



(COSMO SHONAN SEMINAR HOUSE)

Dispatch of Expert

4

We send our experts abroad, where they assist officials, engineers and other counterparts in governmental projects. Our experts are also sent to conduct feasibility studies, company diagnoses and other consulting services.



(Workshop in UAE)

CO., LTD.

We conduct studies on prevention of global warming in the oil-producing countries and developing countries.

**Energy saving
Environmental protection .**



(Workshop in Yemen)

Example of Technical Cooperation for Oil-producing Country

Flare Gas Recovery Project in UAE

**Abu Dhabi Oil Refining Company
(Takreer)
and
Cosmo oil**

COSMO activities in Abu Dhabi, UAE

7

<COSMO activities>

OIL exploration & production since the 1960s

Established subsidiary Abu Dhabi Oil in 1968

- **UAE is the biggest exporter to COSMO.**
- **Exchange of personnel, Technical assistance, Cultural exchange**

<HSE in UAE>

UAE is presently working on HSE

(Health, Safety & Environment) Program.

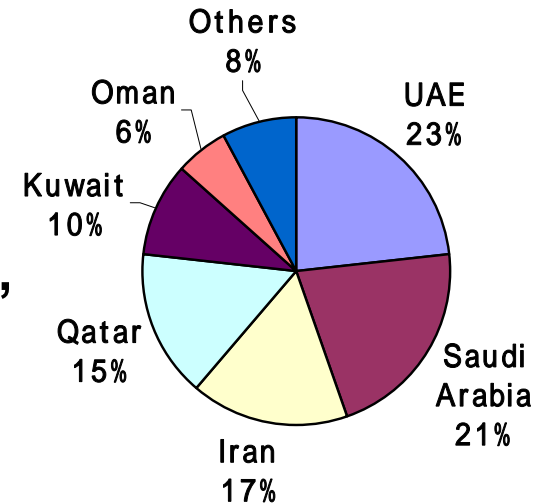
Reduction of flare gas is an important issue.

- **Environmental pollution by Gas flaring**
- **Conserving gas resources**

<COSMO experiences>

Two Flare gas recovery(FGR) systems are working in our refineries

COSMO and Takreer have started the FGR Project to reduce the environmental impact through COSMO's technology.



 **COSMO OIL CO., LTD.**

<http://www.cosmo-oil.co.jp>

Operation condition (before FGR project)

Field selection

TAKREER	Ruwais Refinery	Hydoskimmer (HS)	More Flare Gas.Takreer requests the 1st priority.
		Hydrocracker (HC)	
		Condensate 1st	Construction work for new project in 2005.
	Condensate 2nd		
	Abu Dhabi Refinery		Less than Ruwais Refinery.



Hydoskimmer (HS)

- Crude distillation
- Cat. reformer
- Kero. & HGO- HDS
- Sulfur Recovery
- Others

Hydrocracker (HC)

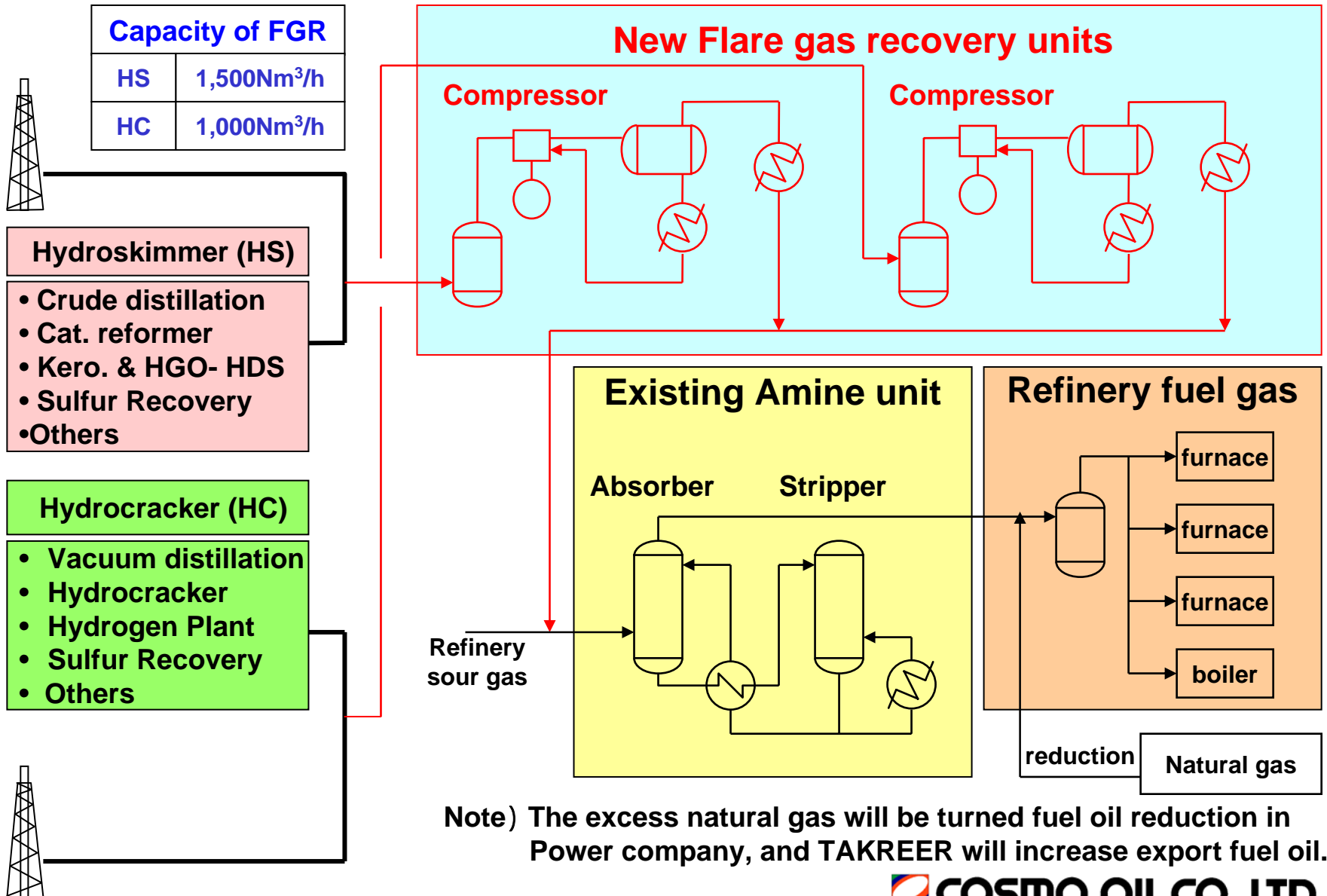
- Vacuum distillation
- Hydrocracker
- Hydrogen Plant
- Sulfur Recovery
- Others



Main bleeding points & Flow rate(Nm³/h) of flare gases

Sec.	Bleeding point	Flow rate (Nm ³ /h)	
HS	Crude Distillation Unit Main tower top section	1,500	2,500
	Naphtha HDS Naphtha splitter top section	300	
	Others	700	
HC	Hydrocracker Distillation column top section	250	1,000
	Hydrocracker Splitter top section	50	
	Others	700	

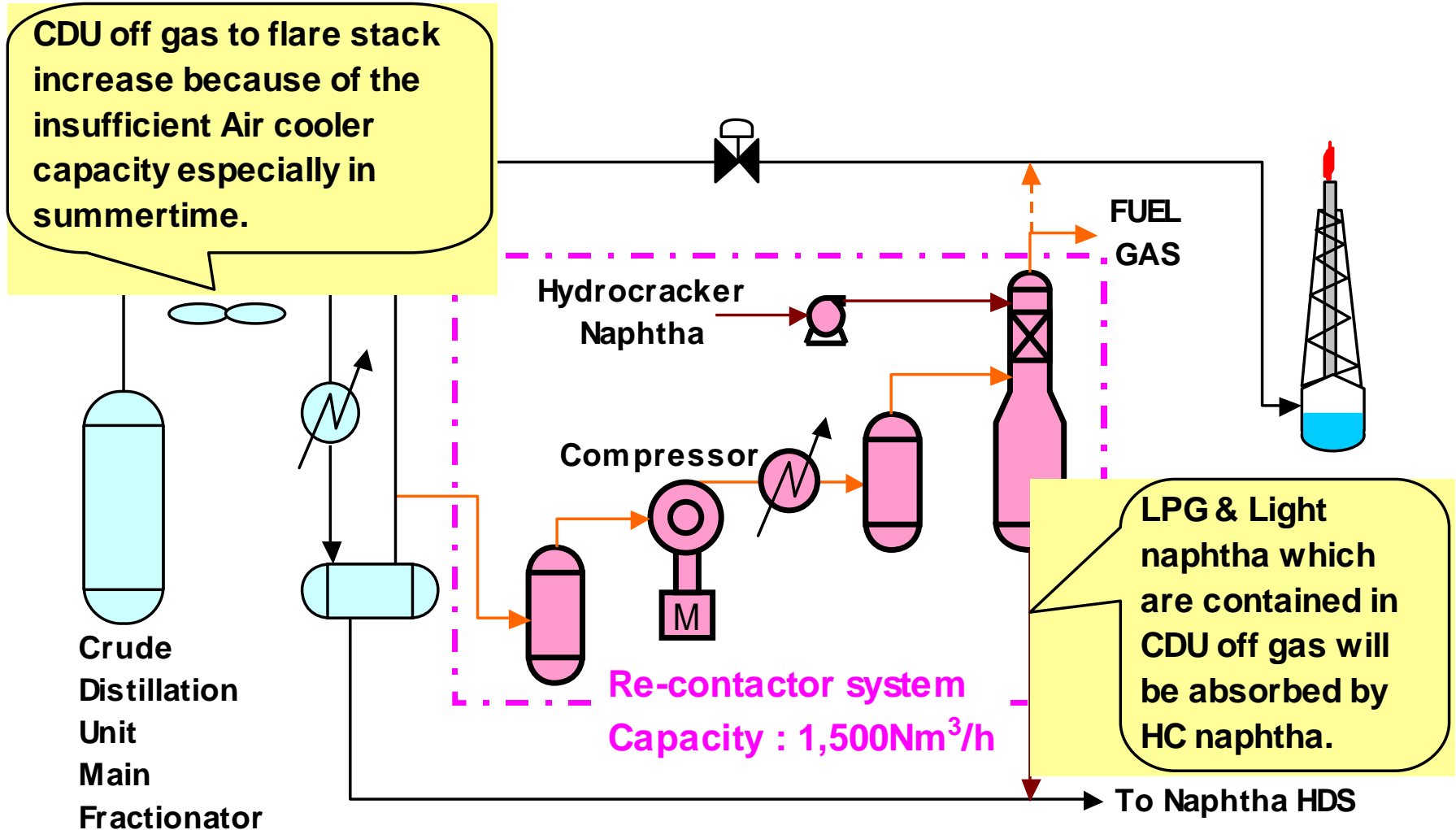
Simplified flow of FGR system



Note) The excess natural gas will be turned fuel oil reduction in Power company, and TAKREER will increase export fuel oil.

Simplified flow of Re-contactor system

Installing Re-contactor system in CDU overhead section.



Environmental positive impact

	Flare gas recovery unit	Re-contactor	Total
Recovered flare gas flow rate (Nm ³ /H)	1,200	800	2,000
CO ₂ reduction (Ton/Y) (CO ₂ base) * ¹	23,000	13,000	36,000
SOX reduction (Ton/Y) (SO ₂ base) * ²	200	130	330

*1 : Refinery fuel gas is balanced by NG (CH₄) usage reduction

*2 : Sulfur recovery ratio of Sulfur recovery unit is assumed to be 97%

Estimated recovered quantity by installing Re-contactor LPG & Light Naphtha (Ton/Y)	C ₃	C ₄	LN
	570	1340	1930