Oil Exploration and Production Business of the Cosmo Energy Group

Business Briefing Materials, October 2016

(Revised in February 2017)

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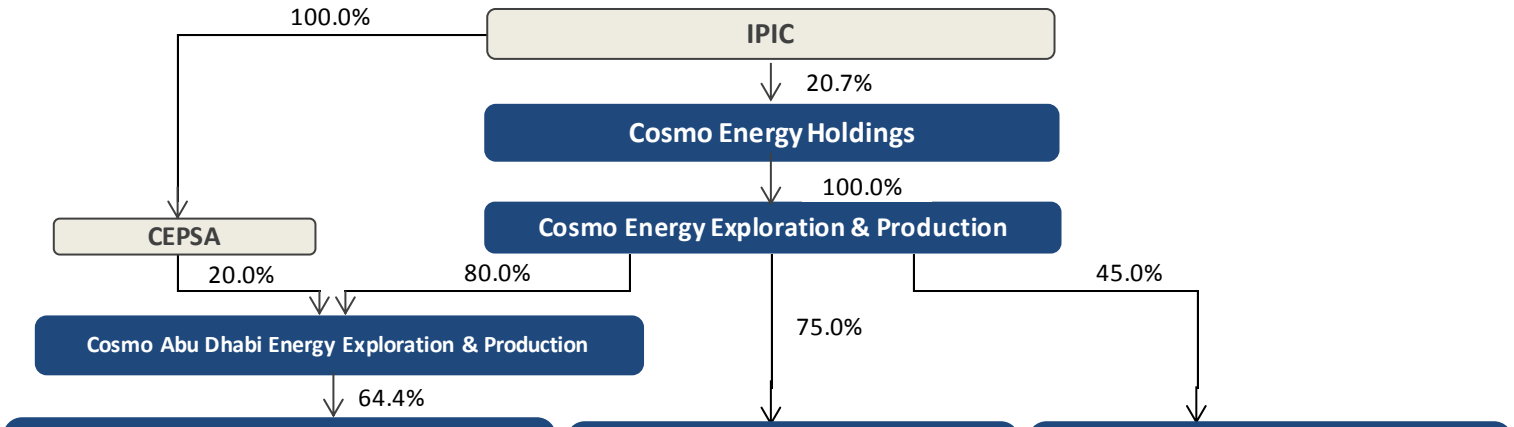
1. (1) Organization of the Oil E&P of the Cosmo Energy Group



Abu Dhabi Oil Company (ADOC) (Operator)

■ **Investment Ratios:**
Cosmo Abu Dhabi Energy Exploration & Production (64.4%), JX Nippon Oil & Gas Exploration (32.2%), Kansai Electric Power (1.7%), Chubu Electric Power (1.7%)

■ **Start of Production:**
1973 - 2012
> Interests extended for 30 years (to 2042)

■ **Contract Type:**
Concession Agreement

■ **Production Oilfields:**
Mubarraz Oilfield, Umm Al-Amber Oilfield, Neewat Al Ghalan Oilfield, Hail Oilfield (planned to start production in FY2017)

■ **Method of enhanced oil recovery**
Sour gas injection, Gas miscible flooding

Qatar Petroleum Development (QPD) (Operator)

■ **Investment Ratios::**
Cosmo Energy Exploration & Production (75%), Sojitz (25%)

■ **Start of Production:**
2006

■ **Contract Type:**
Product Sharing Agreement

■ **Production Oilfields:**
A-North Oilfield, A-South Oilfield, Al-Karkara Oilfield

■ **Method of enhanced oil recovery**
Sour gas injection, Water injection

United Petroleum Development (UPD) (Operator)

■ **Investment Ratios:**
Cosmo Energy Exploration & Production (45%), JX Nippon Oil & Gas Exploration (45%), Mitsui Oil Exploration (10%)

■ **Start of Production:**
1975

■ **Contract Type:**
Concession Agreement

■ **Production Oilfields:**
El-Bunduq Oilfield

■ **Method of enhanced oil recovery**
Sour gas injection, Water injection

1. (2) Strengths of the Oil E&P business of the group

✓ Risk Tolerance	: Low oil price risk, exploration risk, funding risk
✓ Growth Strategy (Production Increase)	: The Hail Oil Field development, Consideration of joint development with Cepsa
✓ Long-term Stable Production	: Solid trust relationships of trust with oil producing countries, High quality oil fields and oil recovery technologies

■ Risk Tolerance ■

- **Earning power under low oil prices(Dubai crude oil $30/B) → (see page 4 ; Changes in ordinary income)**
- **Achieving low-cost development through discovered and undeveloped oilfields (including the Hail oilfield) → (see page 5-6 ; Development, Production)**
- **Loans provided by Japanese public institutions (JBIC) with credit of the operator (ADOC)**

■ Growth Strategy ■

- **At peak production, the Hail Oil Field is expected to reach production capacity equivalent to the three existing oilfields of ADOC → (see page 7, 9-11 ; Progress, Production volume, Investment)**
- **Strategic comprehensive alliance with IPIC-owned Cepsa, deliberating new oilfield development with Abu Dhabi National Oil Company and CEPSA → (see page 8)**

■ Long-term Stable Production ■

- **Obtained interests before founding of UAE, with safe operation and stable production for almost five decades → (see page 9 ; Production volume, page 15-24 ; Reservoir / Oil recovery technology)**
- **Long-term, stable purchase of crude oil from UAE (Abu Dhabi) and Qatar**
- **Contributions to both countries in terms of culture(Japanese language education, etc.) and the environment (zero flaring, etc.) → (see page 12-13 ; Education, page 25 ; Environment)**

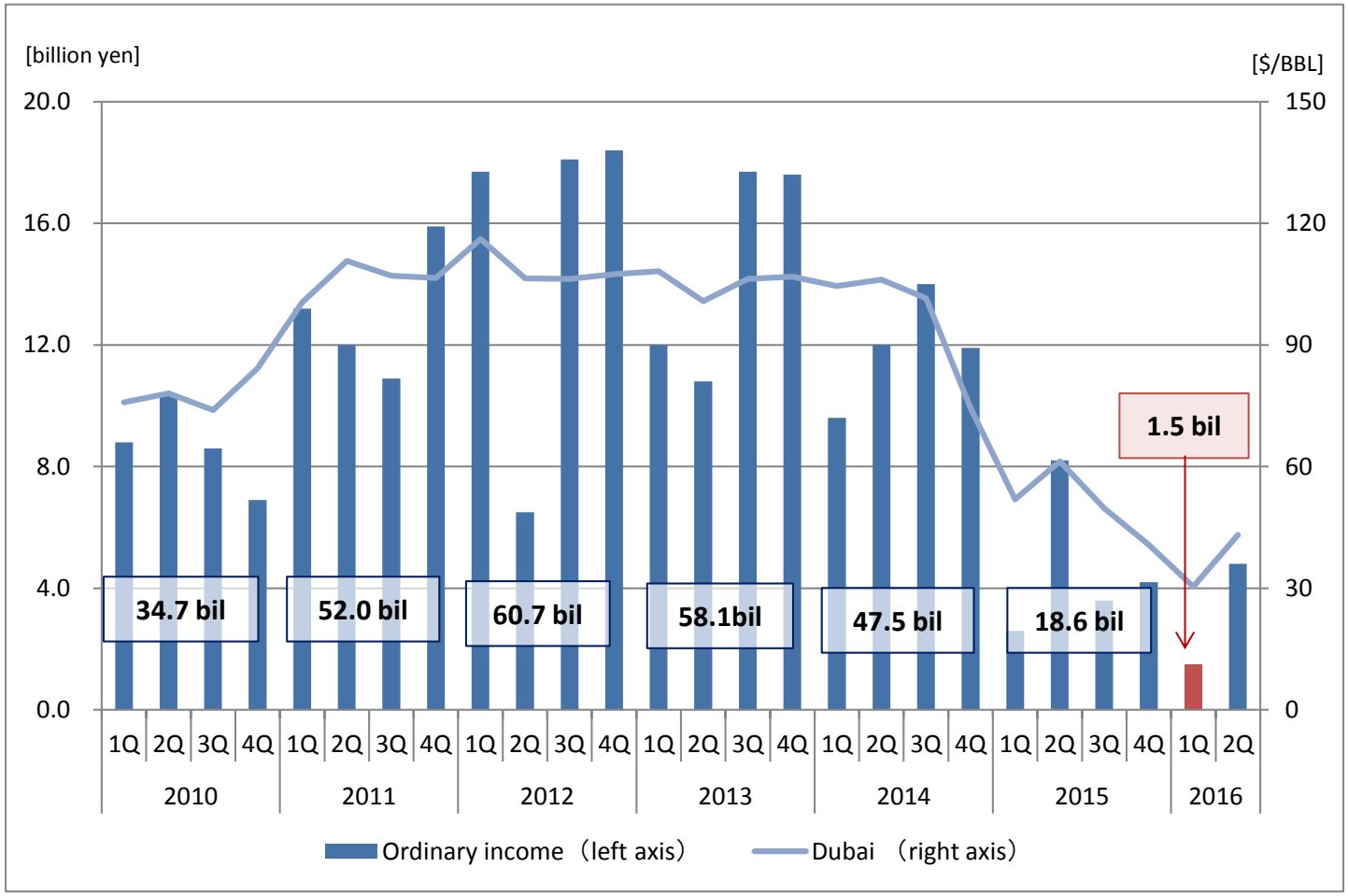
Business Environment in the Middle East Region (UAE / QATAR)

- The Arabian Gulf has many reserves and a lot of exploratory data has been accumulated (which translates into low oil exploration costs)
- Shallow water depth (relatively lower exploration, development and operating costs)
- Countries are politically stable, representing minimal country risks

1. (3) Risk Tolerance - Risk of falling oil prices -

✓ Under the circumstances of the Dubai crude oil averaged $30/bbl, ordinary income in 1Q FY2016 resulted ¥1.5 billion.

(Oil E&P) Ordinary Income



1. (3) Risk Tolerance - Exploration risk -

✓ As the oil fields of the company are those that have already been discovered but are yet to be developed, there is no exploration risk (risk in terms of discovering crude oil).

General flow of oil E&P		Hail Oil Field
Acquisition of concession area	■ Bidding for concession, etc. ■ Conclusion of a contract to acquire concession	FY2011
Exploration	~~■ Collection of basic information on establishment of an oil field based on existing data such as surface geological surveys~~ ■ Implementation of geophysical investigation such as seismic survey (grasping of promising structure) ~~■ Selection of positions of exploratory wells (wells to investigate presence of crude oil) and drilling~~	6 years **Oil fields that have already been discovered but are yet to be developed** ↓ **Shortening of exploration period** **Share existing surface facilities** ↓ **Shortening of development period**
Appraisal	■ Drilling of appraisal wells (wells for examining reserves) ■ Analyze the distribution of oil reserves and assess reserves size ~~■ Determine feasibility of commercial production~~	
Development	■ Drilling of production wells (wells for collecting crude oil) ~~■ Construction of production and shipment facilities~~	
Production	■ Production of crude oil	FY2017
Shipment	■ Crude oil Processing (elimination of impurities, etc.) ■ Loading on crude oil tankers	

6 to 10 years

See next page

(*) Items crossed out with a double line: Items skipped in the Hail development

1.(4) Growth Strategy - Progress of the Hail development -

- ✓ Investment in the Hail Oil Field is reduced by sharing existing surface facilities (approximate estimate: reduction of 300 to 400 million dollars)
- ✓ After Hail begins production, the operating cost per unit is expected to fall due to an increase in the production volume.

■ Abu Dhabi Oil Company: Operation sites

■ Rig (offshore well drilling equipment)
Special equipment that does necessary and indispensable work for maintaining and increasing production, such as the drilling and repair of new wells and the maintenance and replacement of motor pumps installed inside the well. It can operate by moving to different wells because various types of equipment, including derricks, are highly assembled.

Mubarraz Island West

Drilling rigs

Production platform

Mubarraz Island

CFP

Existing facilities (crude oil processing, storage, shipping facilities) can be shared with the Hail Oil Fields.

Approx. 10km

Hail artificial island

■ CFP (Central Facilities Platform)
Collects crude oil produced in production wells in CFP through underwater pipelines and sends them to Mubarraz Island. There is equipment that separates gases and water inside crude oil and power-generating facilities, etc., as well as the Control Room that monitors and controls production wells, the Living Quarter Platform with heliport and housing accommodation, and the BB well platform. The Platforms are connected by a connecting bridge.

1.(4) Growth Strategy - Progress of Hail development -

✓ The construction of an artificial island has been completed, and the drilling of an appraisal well and preparation for the construction of surface facilities are ongoing.

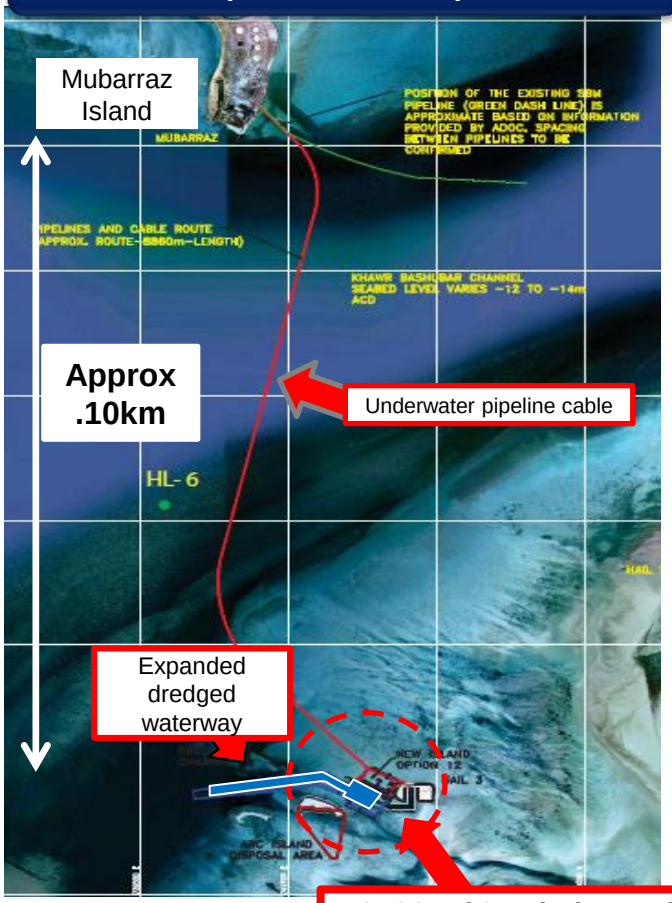
Development Schedule for Hail Oil Field

Main Items		FY2016	FY2017
Water Channel Dredging Artificial Island Construction	–		
Well Drilling	Disposal Wells (2 in total)		
	Delineation Wells (2 in total)		Conversion to Production Wells
	Production Wells (8 in total)		
Surface Facilities EPC (*) Work	Hail Site		
	Mubarraz Island		
Start of Production	–		

(*) Disposal Wells: Wells for the disposal of mud and water generated in the drilling process

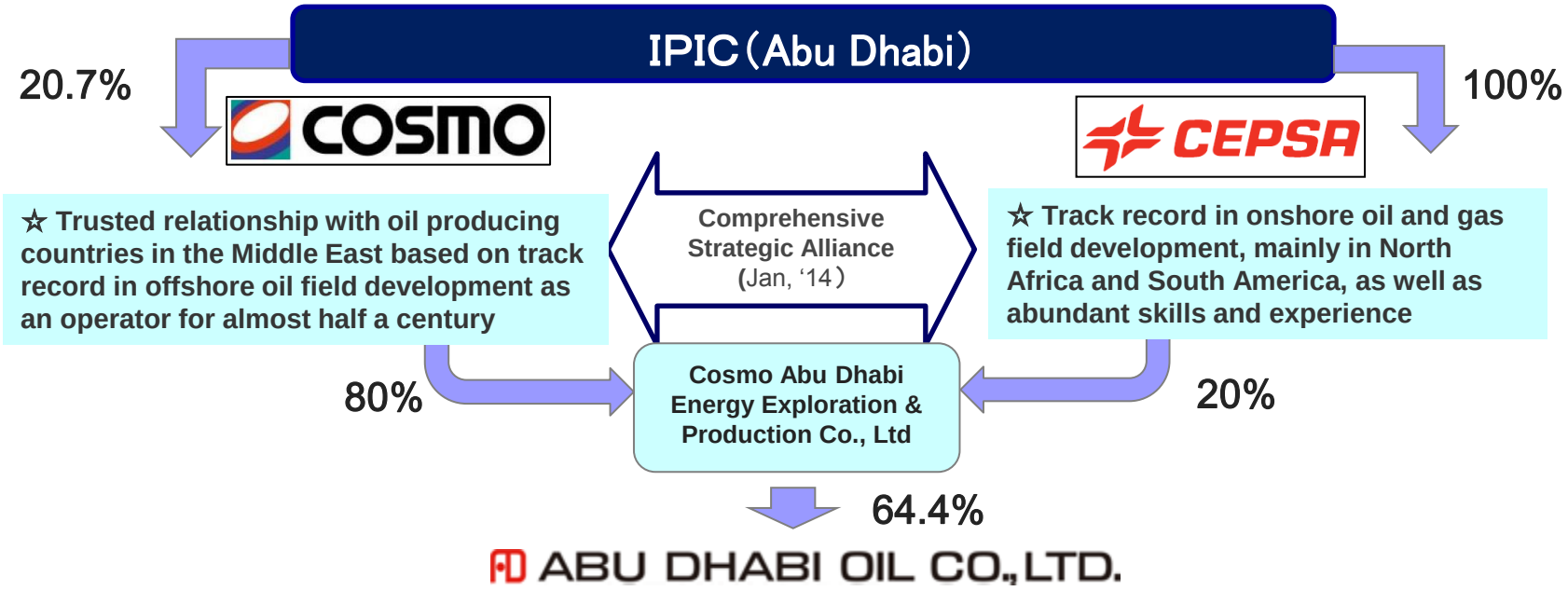
(*) EPC: Engineering, Procurement and Construction

Hail Oil Field and existing shipping terminal (Mubarraz Island)



1.(4) Growth Strategy - Enhancement of alliance with CEPSA -

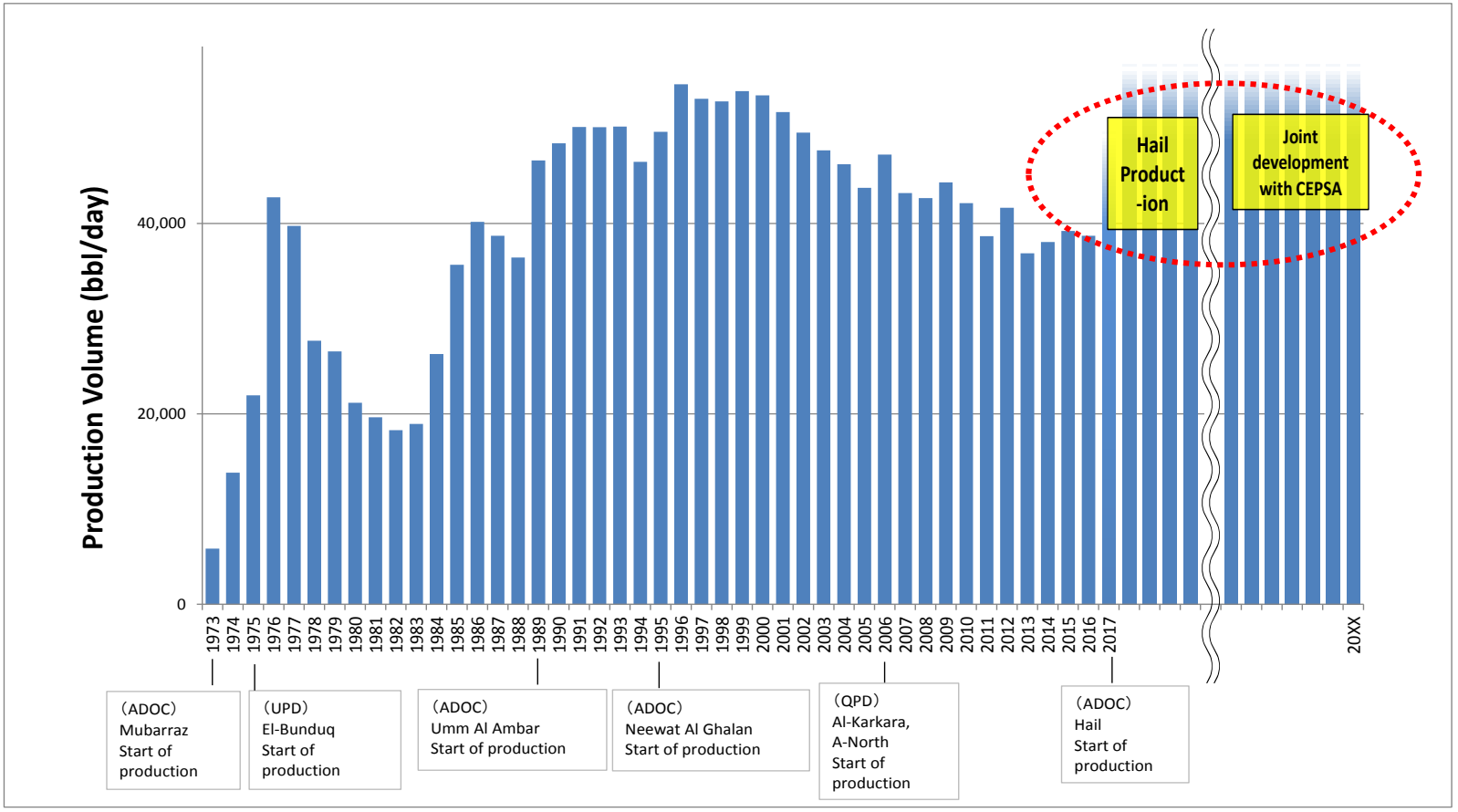
- ✓ Cosmo aims to reinforce and expand the strategic partnership with CEPSA by transferring part of shares of newly established upstream subsidiary “Cosmo Abu Dhabi Energy Exploration & Production” to CEPSA, which is in line with the “Further strengthen alliances with IPIC” policy stipulated as part of the 5th Consolidated Medium-Term Management Plan.
- ✓ Cosmo and CEPSA, as Abu Dhabi family companies, is deliberating to obtain new interests through ACC workshop, provide sales support of crude oil and product marketing and retail, and will consider joint ventures with Maruzen Petrochemical.



1.(4) Growth Strategy, Long-term stable production - Changes in production volume -

- ✓ ADOC has been conducting safe operations and stable production for nearly 50 years.
- ✓ The Hail Oil Field is expected to begin production in FY2017 and estimated to reach peak volume in FY2018.
- ✓ Aiming to acquire a new concession jointly with CEPSA through the ACC workshop.

Crude oil production volume (total of three development companies)

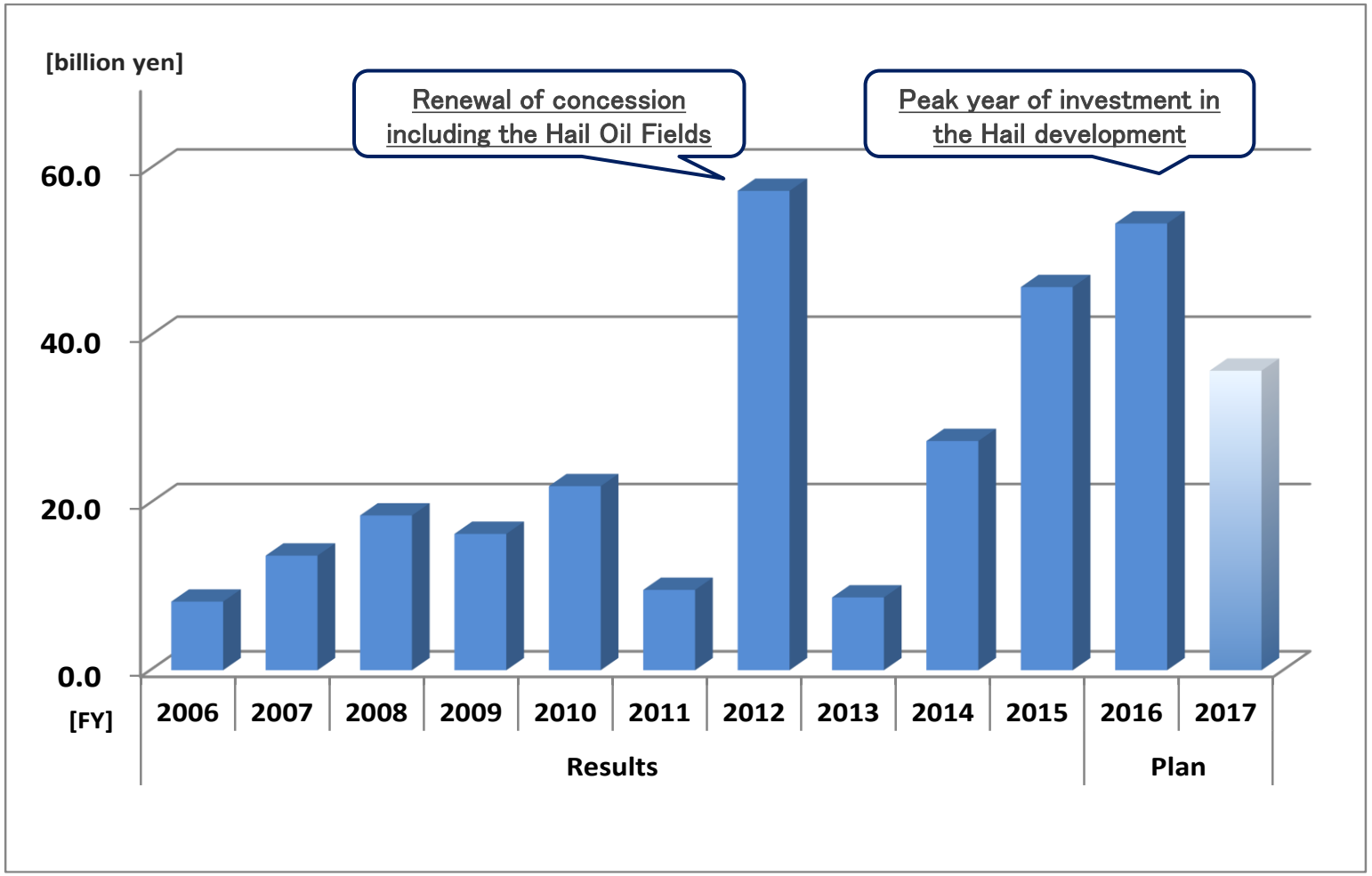


※ ADOC : Abu Dhabi Oil Company、UPD : United Petroleum Development、QPD : Qatar Petroleum Development

(Reference) Changes in the Investment Amount in the Oil E&P Business

✓ The investment amount is expected to decline significantly from FY2017 once the Hail investment peaks out.

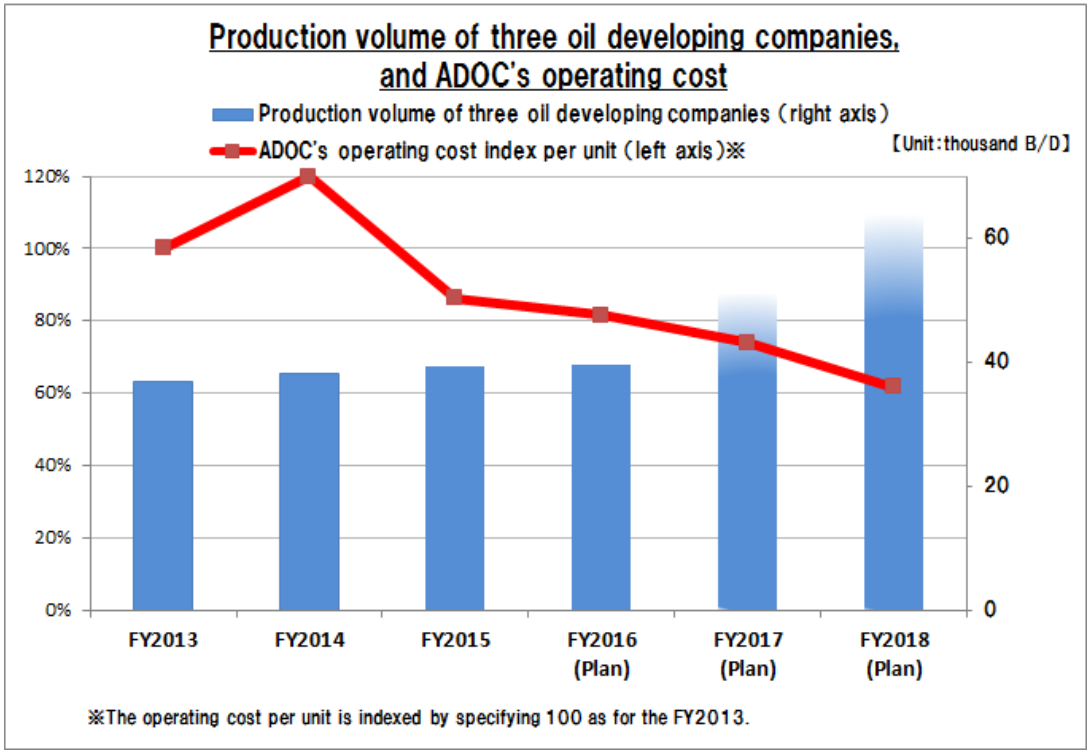
Investment Amount (Oil E&P Business)



(Reference) Earnings Plan of the Oil E&P Business

- ✓ Achieve a reduction in operating costs in the phase of falling oil prices.
- ✓ Anticipate a reduction in operating costs per unit after the commencement of the Hail production.

Changes in operating cost (*) of ADOC



(Oil E&P) Ordinary Income

Unit : billion yen

	FY2015 Results	FY2016 Forecast (*1)	FY2017 Forecast (*2)
Ordinary Income	18.6	10.5	61.0
Dubai crude oil price ($/B) (average of Jan-Dec)	50.9	41.7	70.0
JPY/USD exchange rate (¥/$) (average of Jan-Dec)	121.1	106.5	120.0

(*1) Based on revised results forecasts for FY2016 (announced in Nov 2016)
(*2) Based on the revised 5th consolidated medium-term management plan (announced in Nov 2015)

(*) Operating Costs: Oil well repair costs, equipment utilities, repair costs, personnel costs related to operation, etc.

1. (5) Solid trust relationships with oil-producing countries
- Contribution activities in Abu Dhabi (1) -

Cosmo Energy Exploration & Production and Abu Dhabi Oil Company offer a Japanese-language education program at Applied Technology High School, a local high school in Abu Dhabi, in cooperation with the Ritsumeikan Trust to contribute to a friendly relationship between Japan and Abu Dhabi in the educational arena.

Left: Scene from class　Right: Scene from short-term study program in Japan

This program commenced in September 2011 and has now entered its sixth year. Three Japanese language instructors are dispatched, and approximately 100 students are currently taking the program, although it is treated as an extra lesson. A short-term study program is provided at Ritsumeikan Uji Senior High School in Kyoto every summer and is well received by students. Currently, 10 students from among those who have completed the course are studying in Japan on scholarships from ADNOC (university and a program to study at university at Japanese language school).

1. (5) Solid trust relationships with oil-producing countries
- Contribution activities in Abu Dhabi (2) -

(i) Acceptance of children in the UAE at the Japanese school and kindergarten in Abu Dhabi

Japan-UAE Children and Youth Development Interaction Cooperative, an NPO, offers a program for accepting children in the UAE at the Japanese school and kindergarten for the purpose of providing them with Japanese-style education.
As of June 2016, 26 children from the UAE are enrolled.
Abu Dhabi Oil Company handles the office work of the NPO (Cosmo Energy Exploration & Production is also an official member).

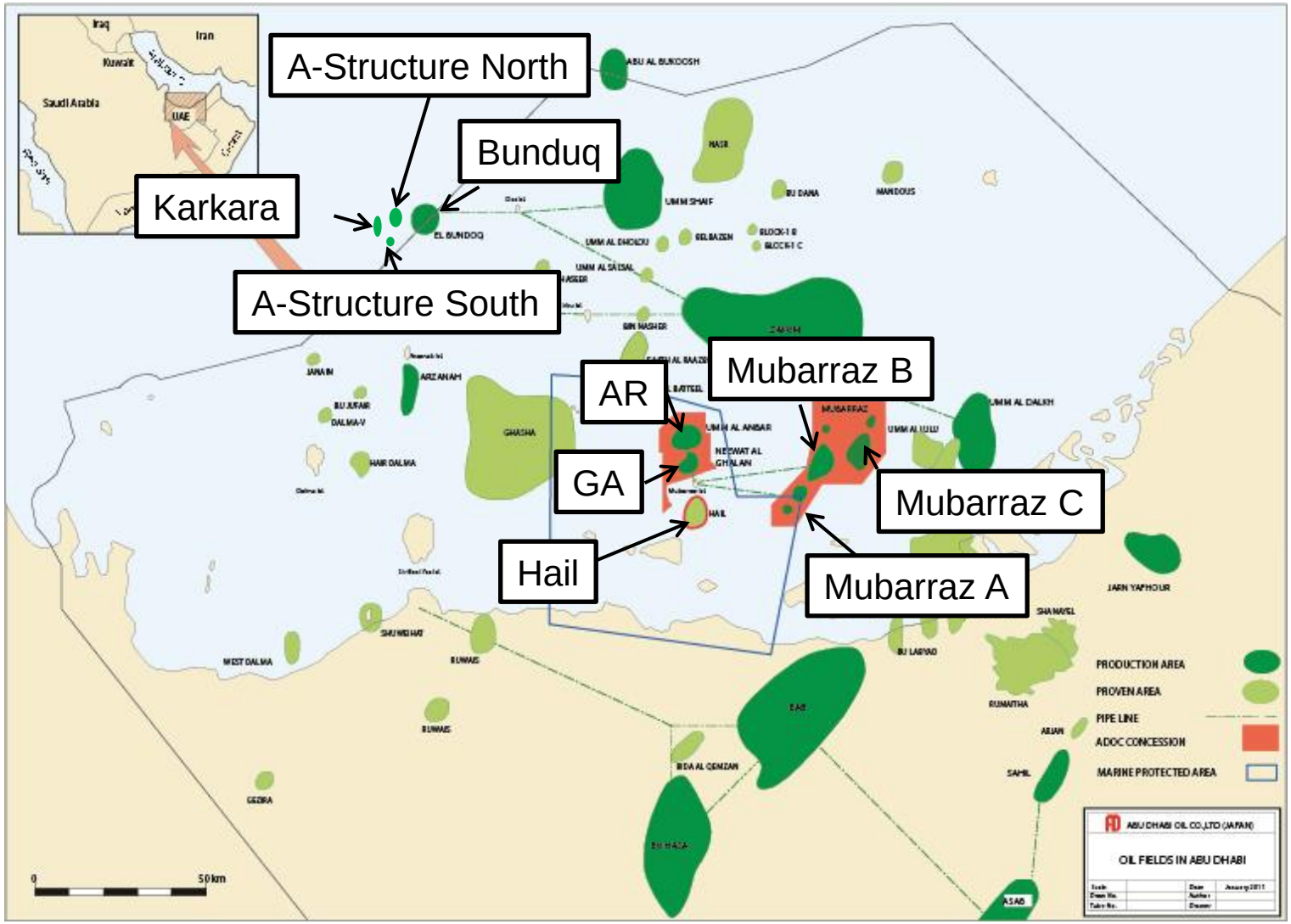
(ii) Sponsorship of PI (Petroleum Institute)

Abu Dhabi Oil Company continues to make donations to PI, a university specializing in petroleum in Abu Dhabi.

Technologies that support long-term production

- Type of oil reservoirs, Crude oil recovery technologies,
- and Development costs -

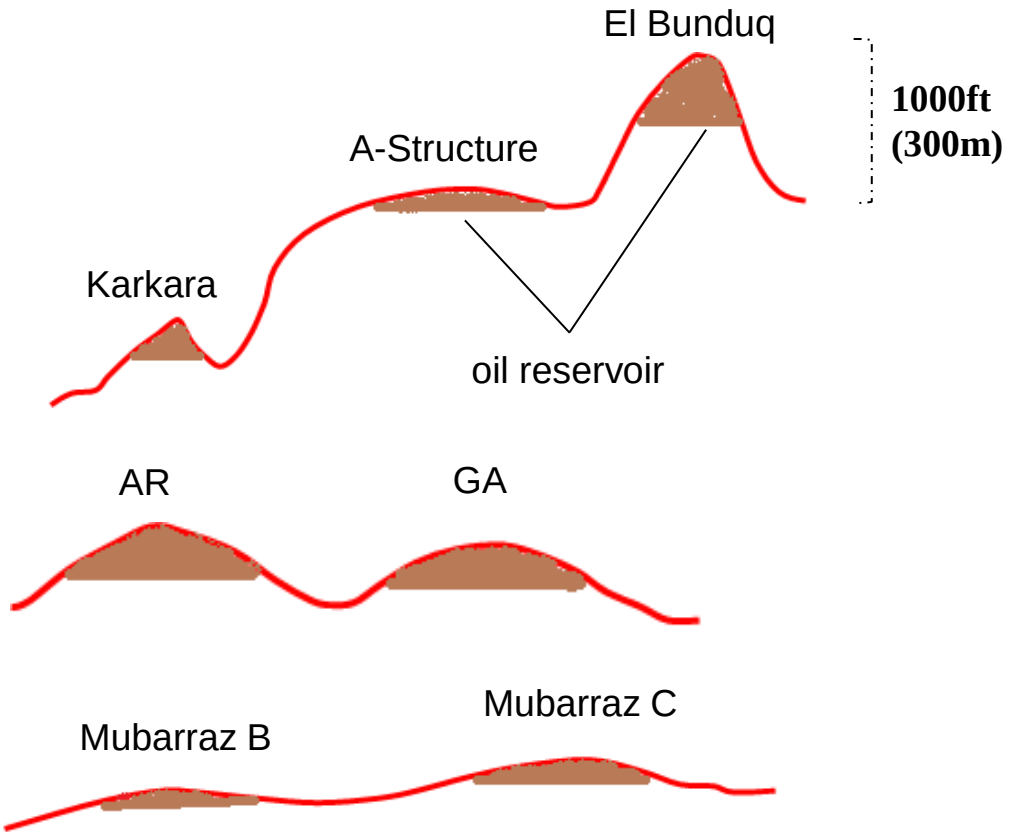
2. (1) Locations of oil fields of our operators



2.(2) Long-term stable production - High-quality oil fields (Structure) -

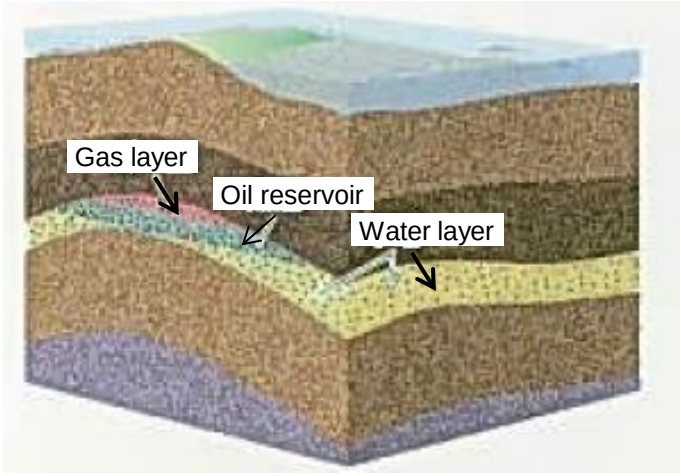
✓ As the oil fields of the Group in the Middle East have a simple anticlinal trap structure, it is easy to identify the location of oil reservoirs, and production management is straightforward.

■ Oil fields of the Group



■ General anticlinal trap (*)

* Trap: A place where oil and gas that have moved inside permeable rocks are retained as they are prevented from moving up.

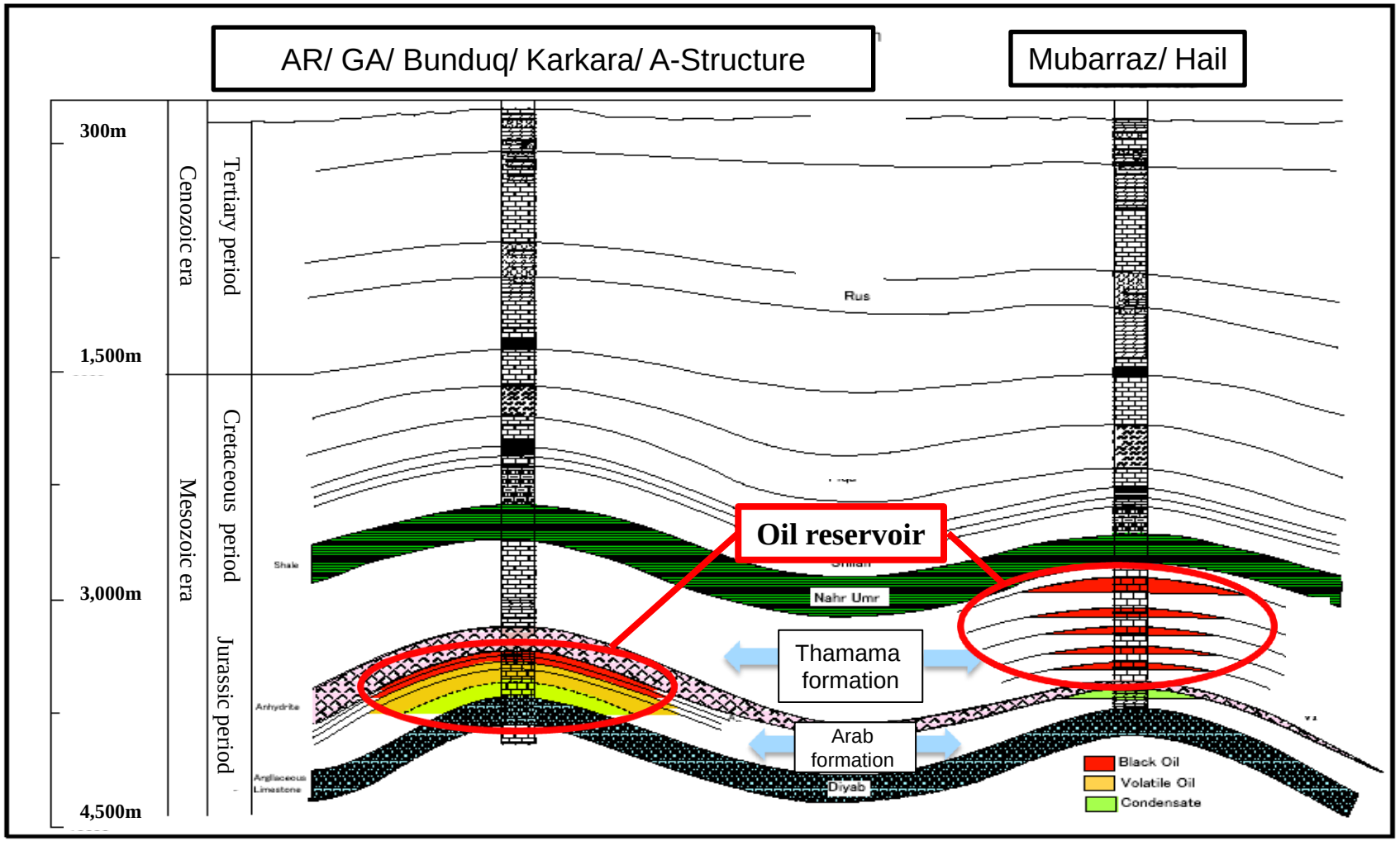


Source: Prepared by the Company based on the “Guide to Development Technologies of Oil and Natural Gases” of the Japan Petroleum Development Association.

- The height of the structure varies from oil field to oil field.
- Mubarraz Oil Field has a relatively flat structure, but the production volume is large due to a large number of oil reservoirs and the wide area.

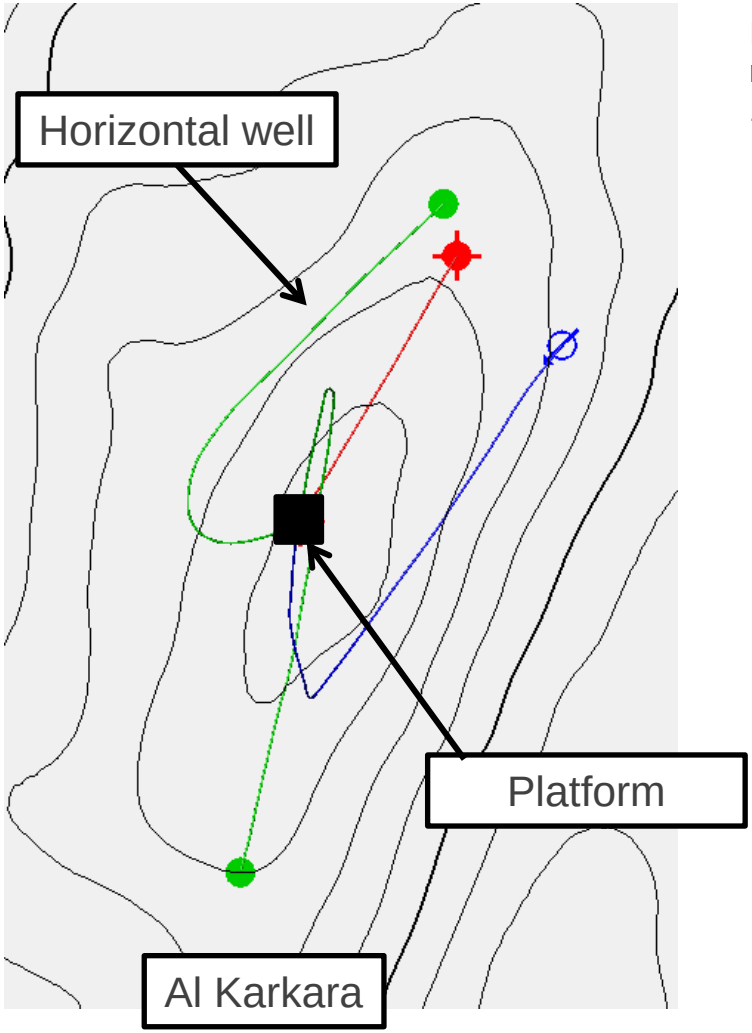
2. (2) Long-term stable production - High-quality oil fields (Oil reservoirs) -

- ✓ Although crude oil in the Arab formation contains a large proportion of sulfur, the Group is able to handle it with its advanced technology (see page 24).
- ✓ In the Thamama formation, there are a number of oil reservoirs at different depths, and the production volume tends to be large.

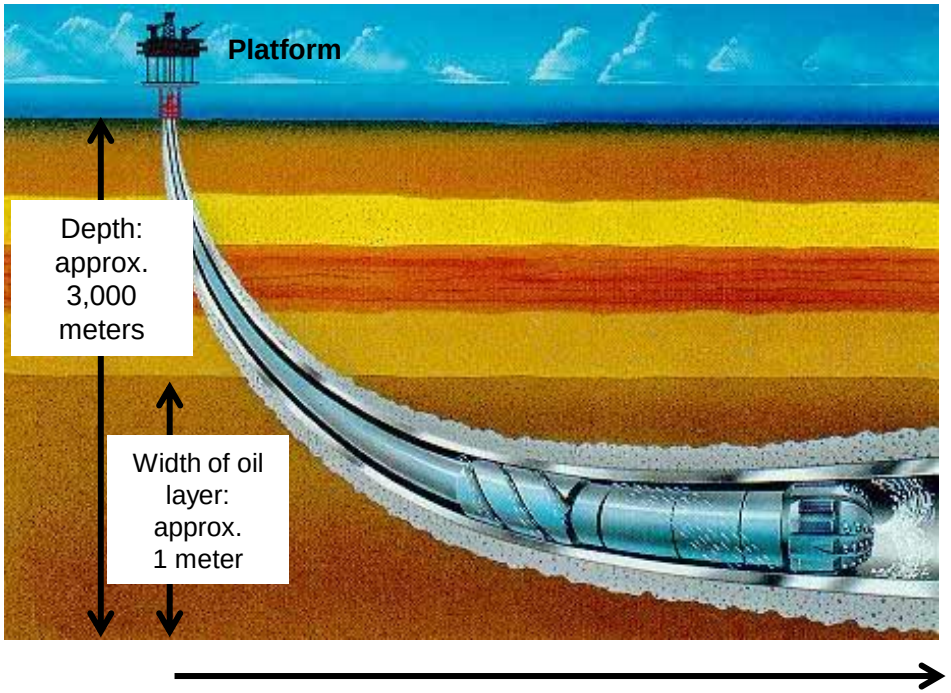


2. (3) Long-term stable production – Horizontal drilling technology -

- ✓ Drill a number of horizontal wells from a single platform.
  (Horizontal drilling has been applied frequently since the 1990s).
- ✓ Maximize the recovery by drilling wells along the structure.



In recent examples, we succeeded in drilling horizontally without missing the target over approx. 2,000 meters in the target layer of 1 meter in thickness.

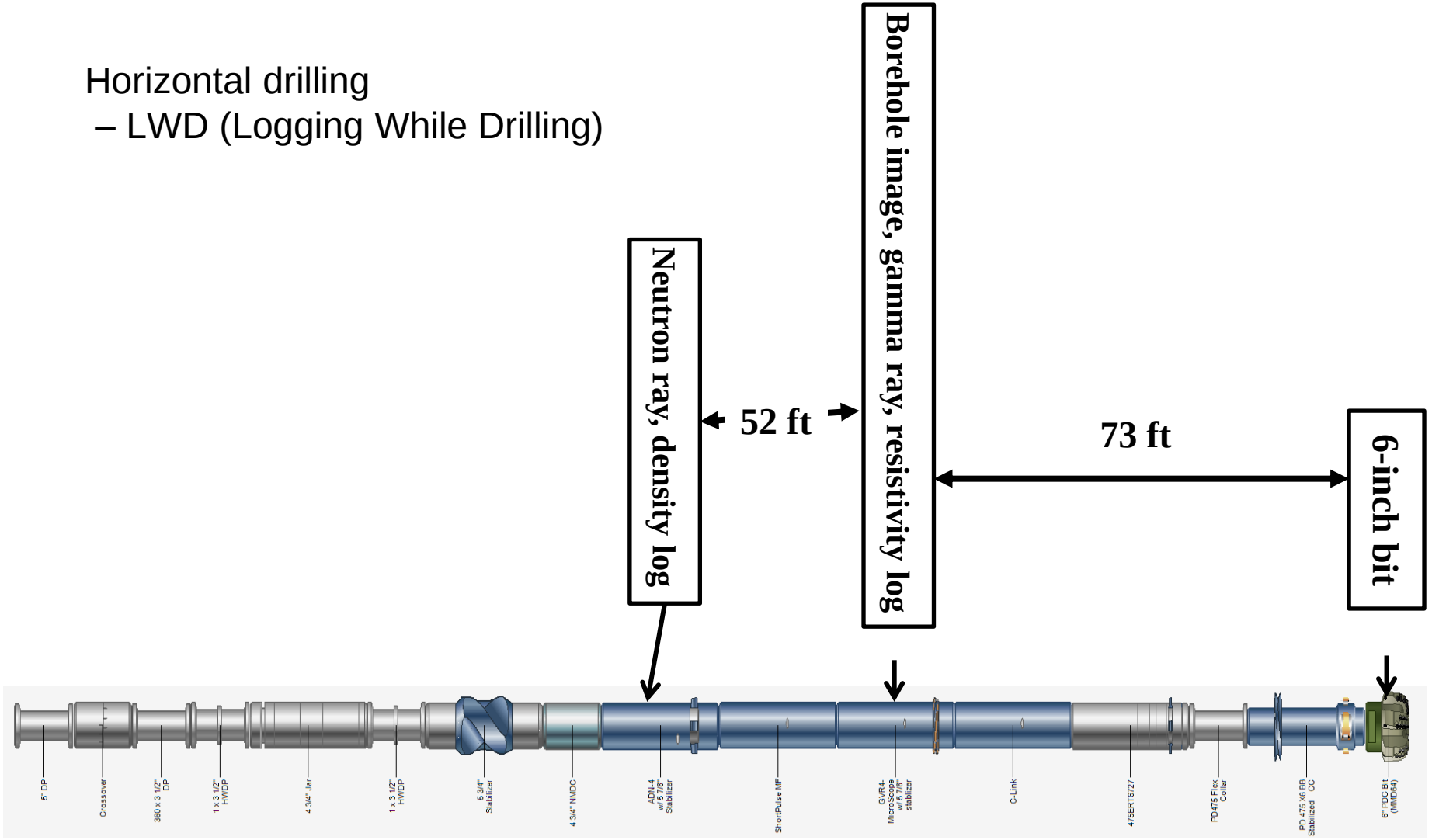


Source: Prepared by the Company based on the “Guide to Development Technologies of Oil and Natural Gases” of the Japan Petroleum Development Association.

(Reference) Horizontal drilling technology - LWD (Logging While Drilling) -

✓ Drill without missing the target by controlling the well trajectory while acquiring logging data during drilling.

Horizontal drilling
– LWD (Logging While Drilling)



2. (4) Long-term stable production – Crude oil recovery technologies -

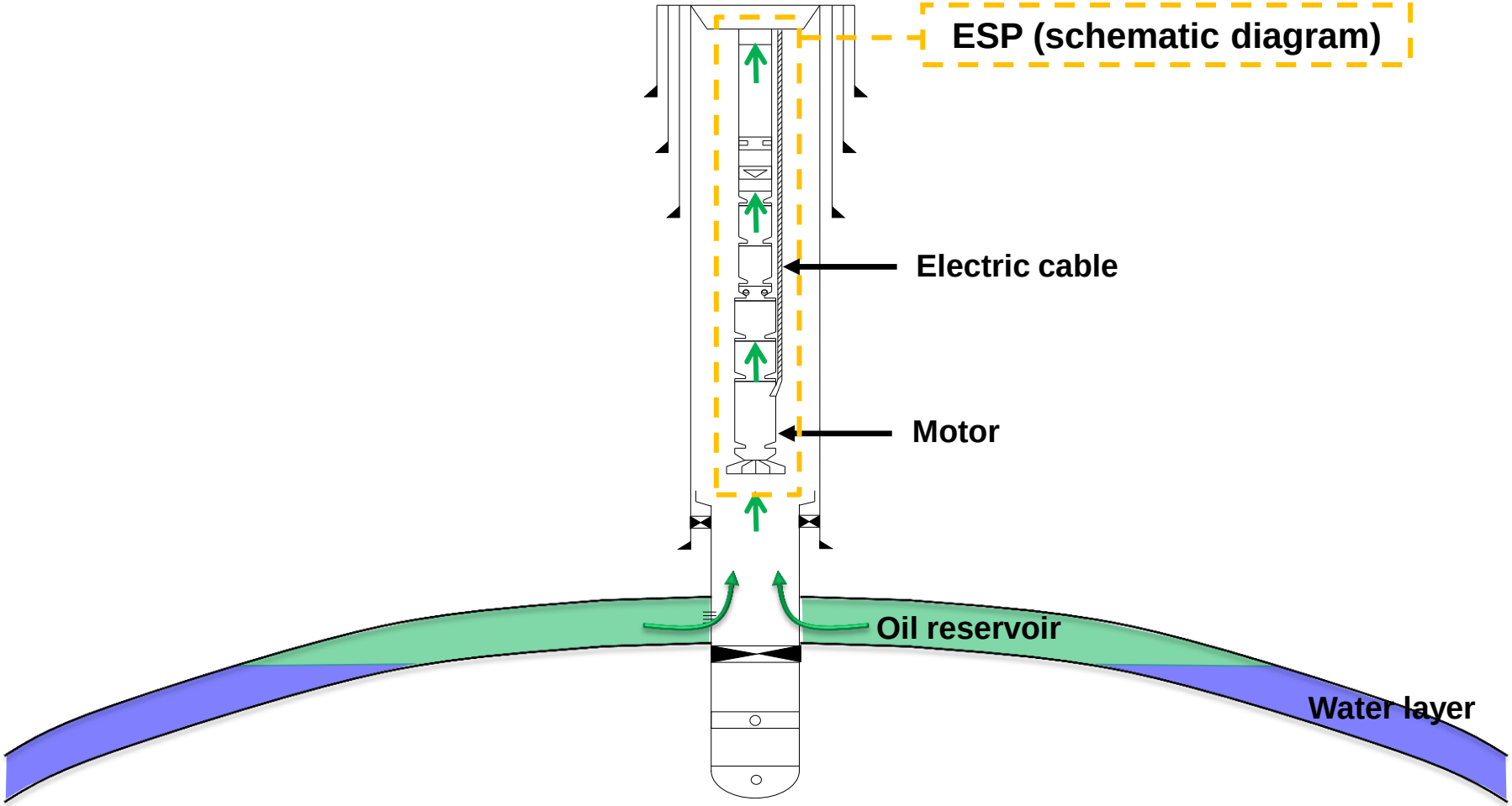
- ✓ The reserves to production ratio (R/P) of the Group total is approximately 24 years. (as of the end of December, 2015)
- ✓ The oil recovery rate is expected to improve due to progress in crude oil recovery technologies.

Classification of the oil recovery method		Oil recovery rate
Primary oil recovery	■ Natural flow production: Recovery by natural reservoir pressure	20%–30%
	■ Artificial lift: Lifting oil by installing pumps inside the well	
Secondary oil recovery	■ Water injection: Maintenance of oil reservoir pressure by water injection and displacement of oil	30%–40%
	■ Gas injection: Maintenance of oil reservoir pressure by gas injection and displacement of oil	
Tertiary oil recovery	■ Thermal recovery: Increases the recovery rate by lowering the viscosity of oil by heat.	40%–60%
	■ Chemical injection: Displacing oils attached to oil reservoir rocks by injecting chemicals.	
	■ Gas miscible flooding: Displacing and collecting oils by immingling gases and oils.	

(*) Frames with a red dotted line show the technologies used by the Cosmo Energy Group.

2. (4) Primary oil recovery – Artificial lift by ESP (Electrical Submersible pump) (Abu Dhabi Oil Company)

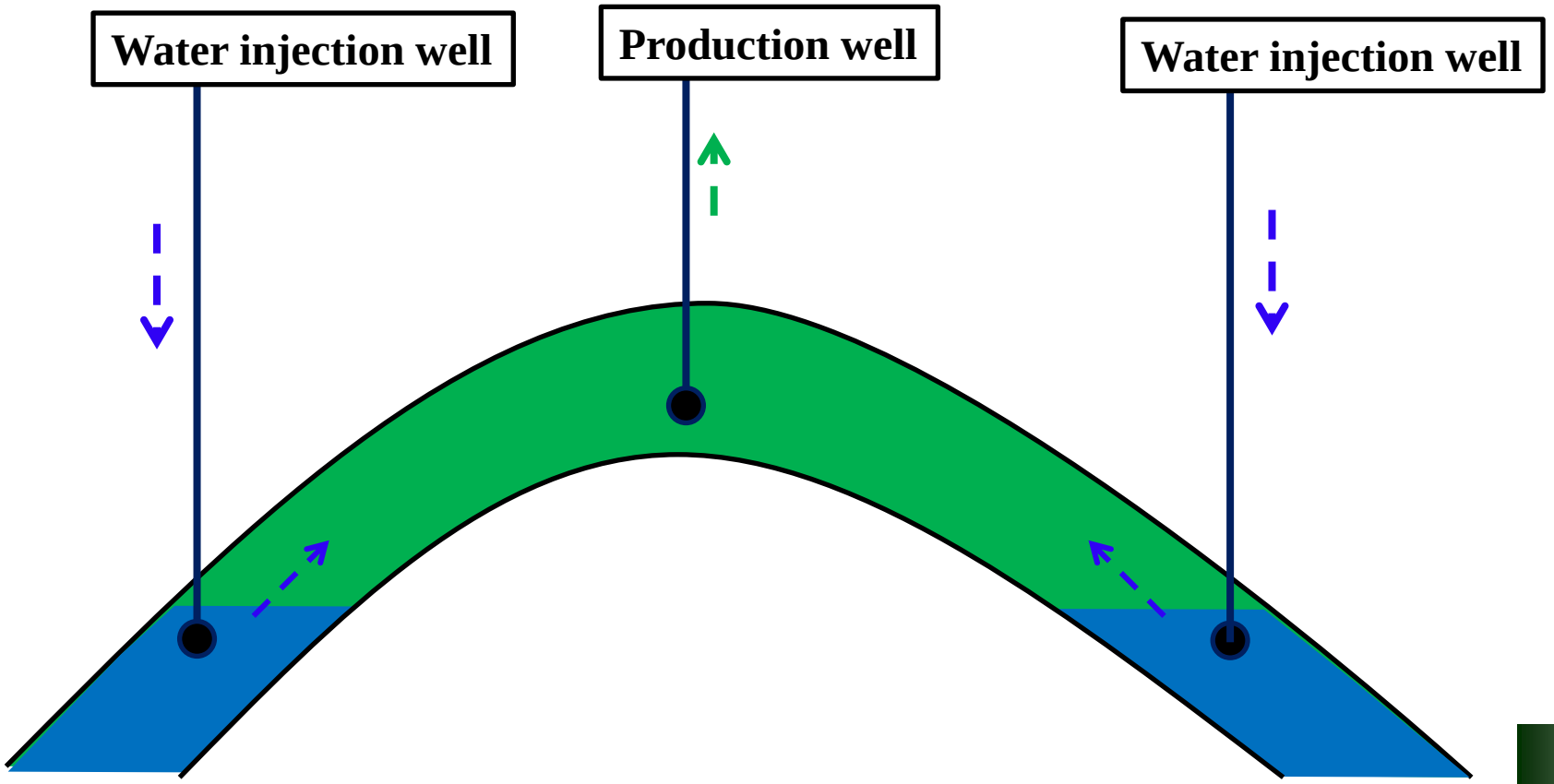
- ✓ Improve the recovery rate by artificially pumping up crude oil using an ESP installed in the well.
- ✓ ESP (a total of 52 pumps) needs to be replaced every three to four years.



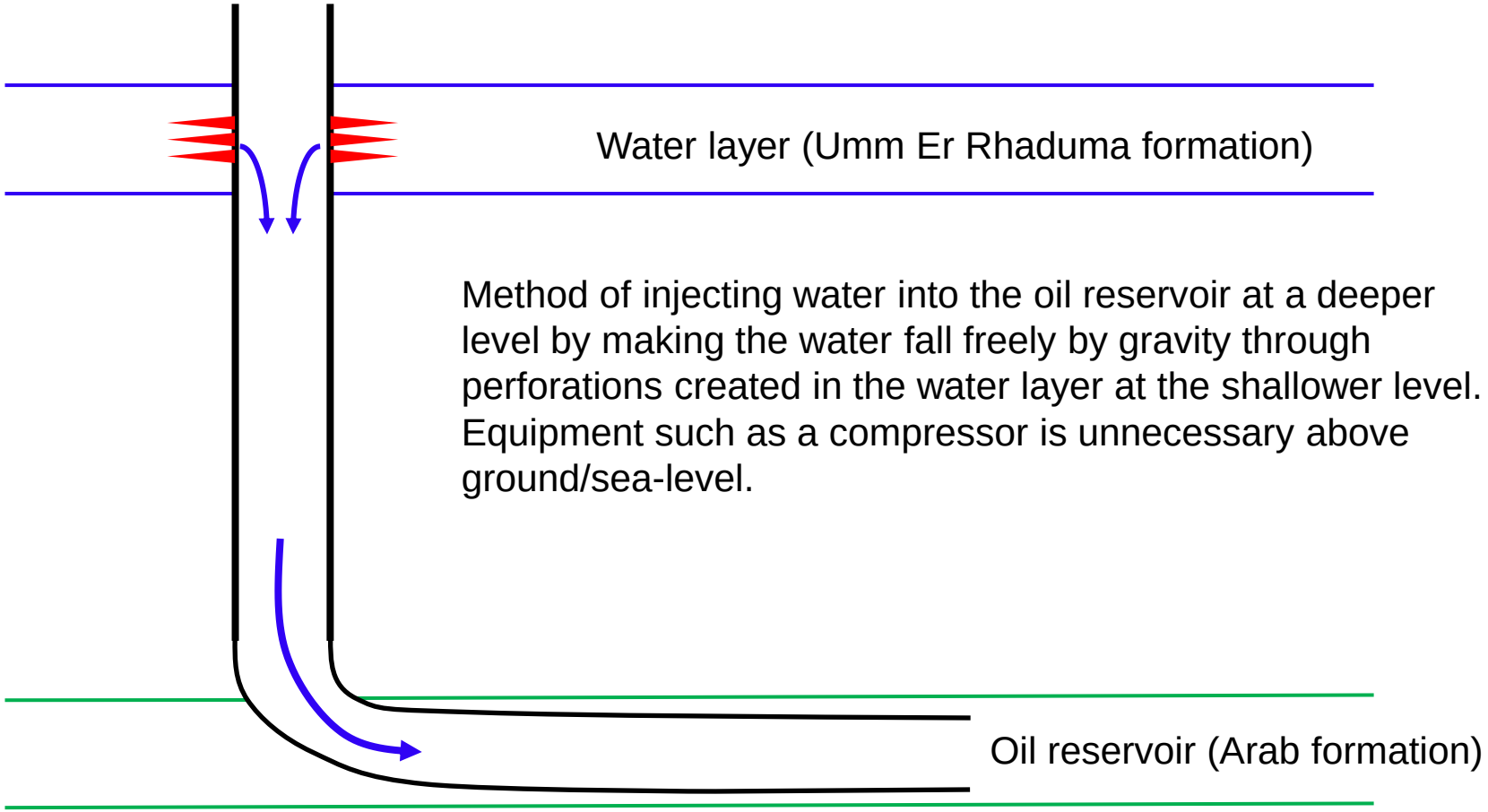
2. (4) Secondary oil recovery - Water injection (United Petroleum Development)

Flooding method of injecting water into the reservoir to recover the oil reservoir pressure that was lowered as a result of oil production. The most general method for enhanced oil recovery in oil fields.

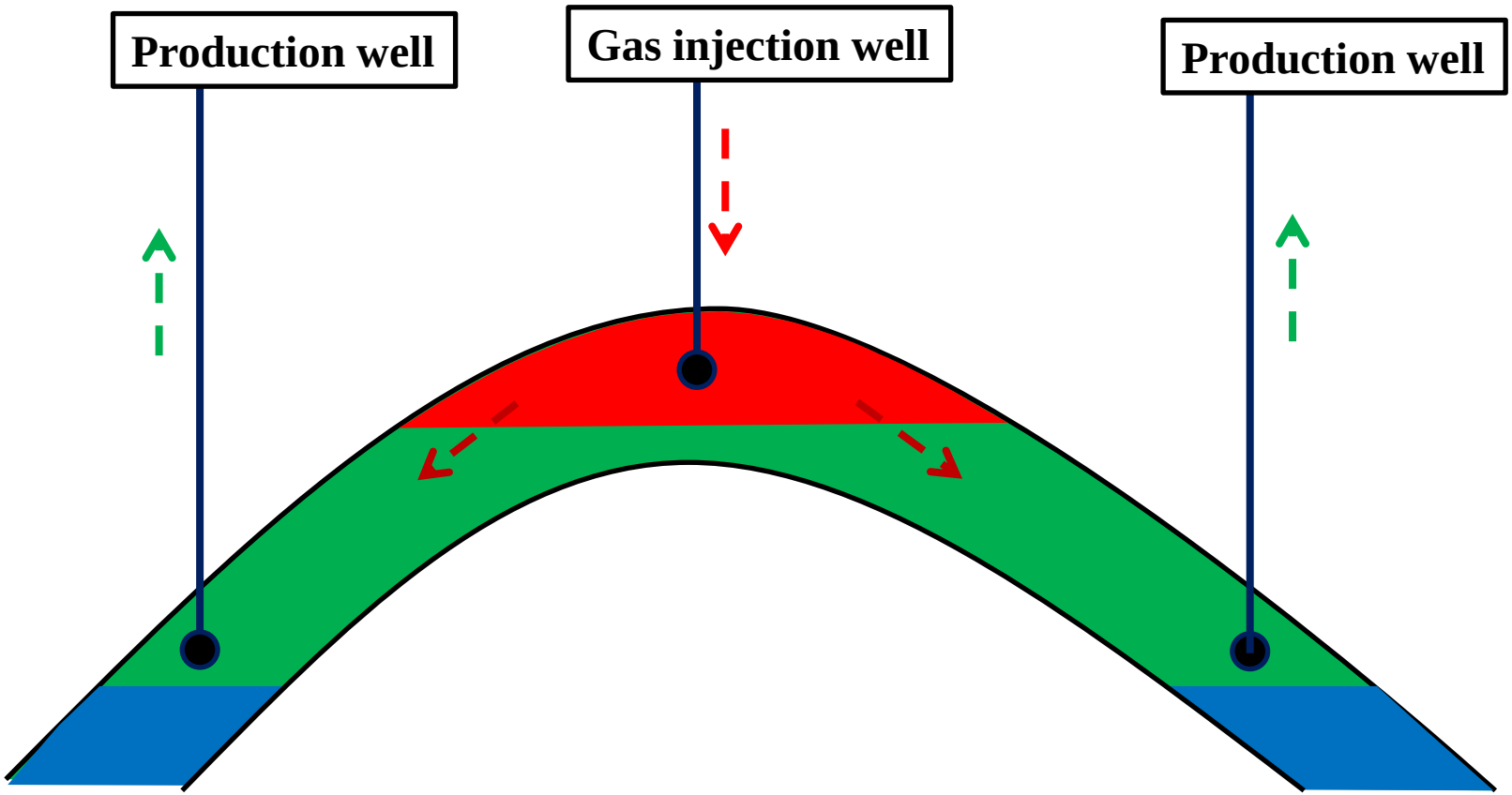
A water source is necessary to inject water. If seawater is used, impurities are eliminated before it is injected. There is also a method of injecting formation water taken from a zone different from the oil layer



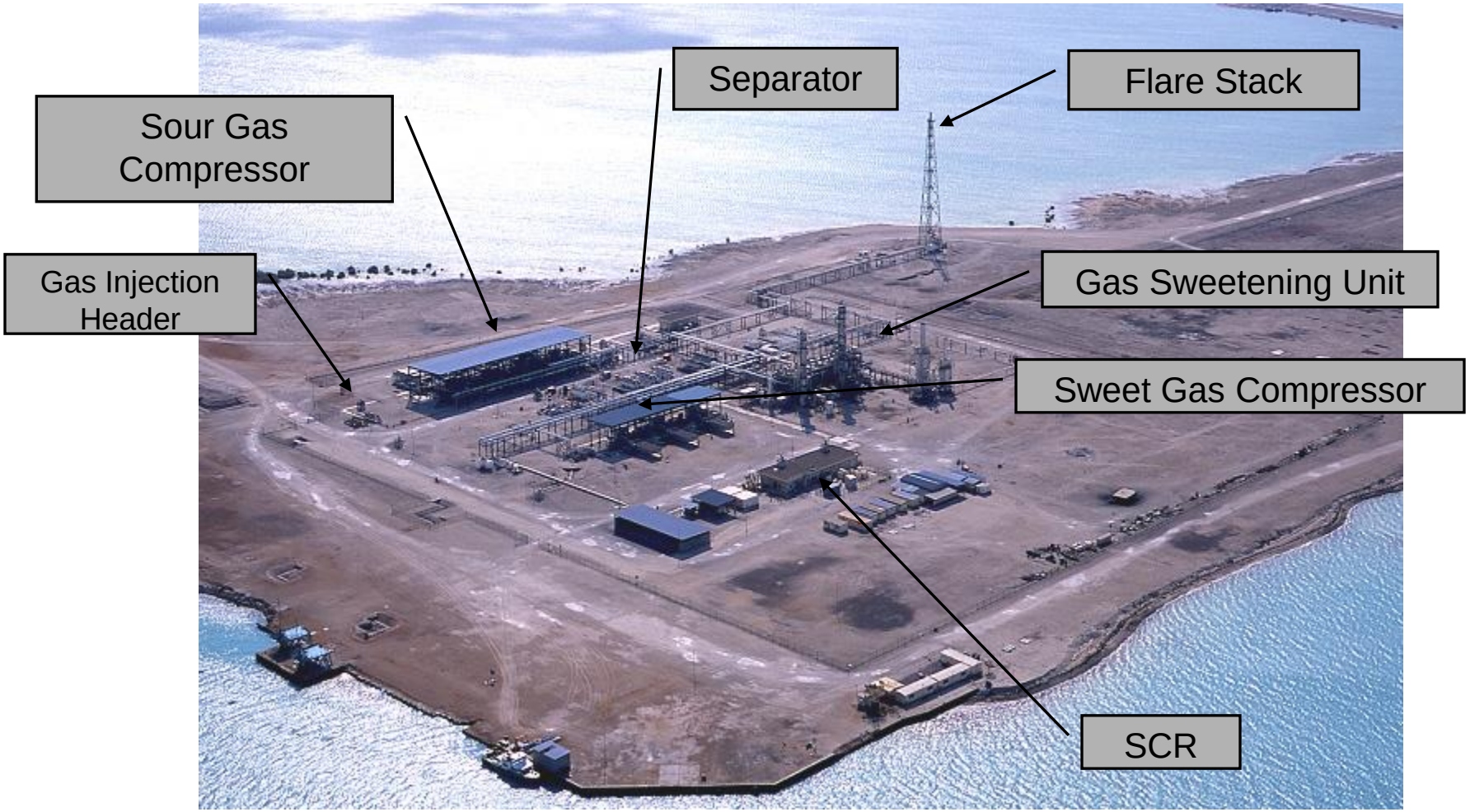
Water injection (Natural Dump Flood)



While water injection pushes oil up through numerous water injection wells in the periphery of the structure, gas injection pushes oil down through a single gas injection well at the top of the structure.



2. (4) Tertiary oil recovery - Hydrogen sulfide gas injection (Abu Dhabi Oil Company)



The sour gas injection facilities of Abu Dhabi Oil Company (unmanned operation is possible). Sour gas is injected after increasing the pressure to 4,500 psi (*) (more than 300 times atmospheric pressure, which is approx. 14.7 psi).

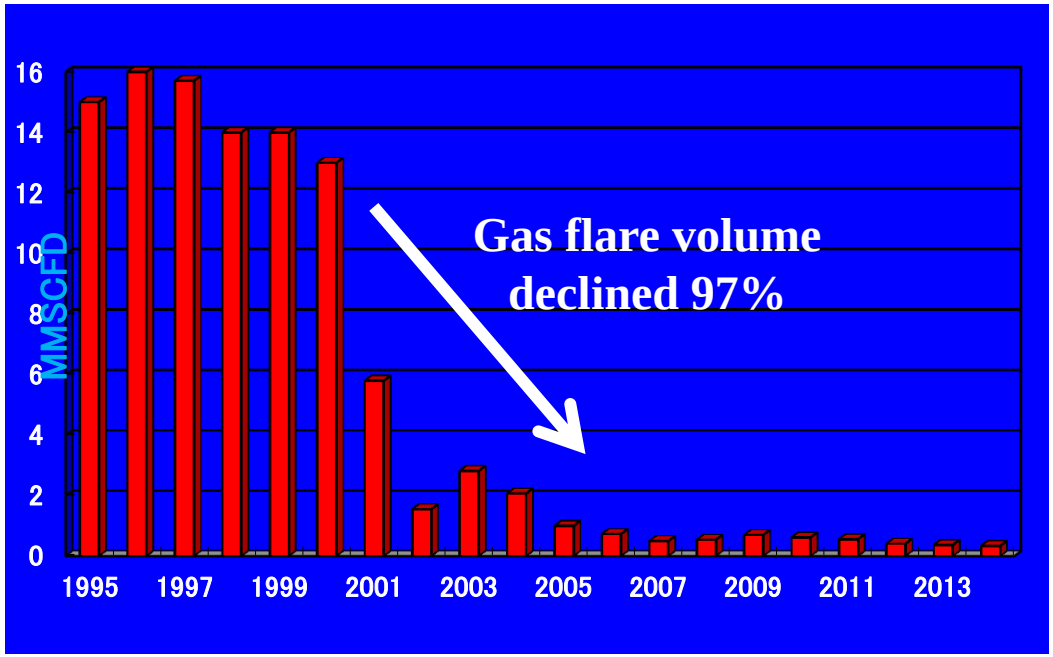
(*) psi : pound-force per square inch

(Reference) Eco-friendly Oil E&P

Zero-Flare Project

■ Achieved zero-flare for the first time in the Middle East.

- Abu Dhabi Oil Company has been conducting zero-flare operation since 2001 by injecting gas generated together with the production of oil into oil reservoirs underground after collecting the entire volume of the gas.
- Achieved environmental protection, resources conservation and a higher oil recovery rate at the same time.
  - ー Reduced the emission of greenhouse gases by 200,000 tons a year in CO_2 equivalent.
    ⇒ Received the “HSE Award Top Honor” presented by Abu Dhabi National Oil Company.
- Qatar Petroleum Development and United Petroleum Development also conduct the injection of associated gas.

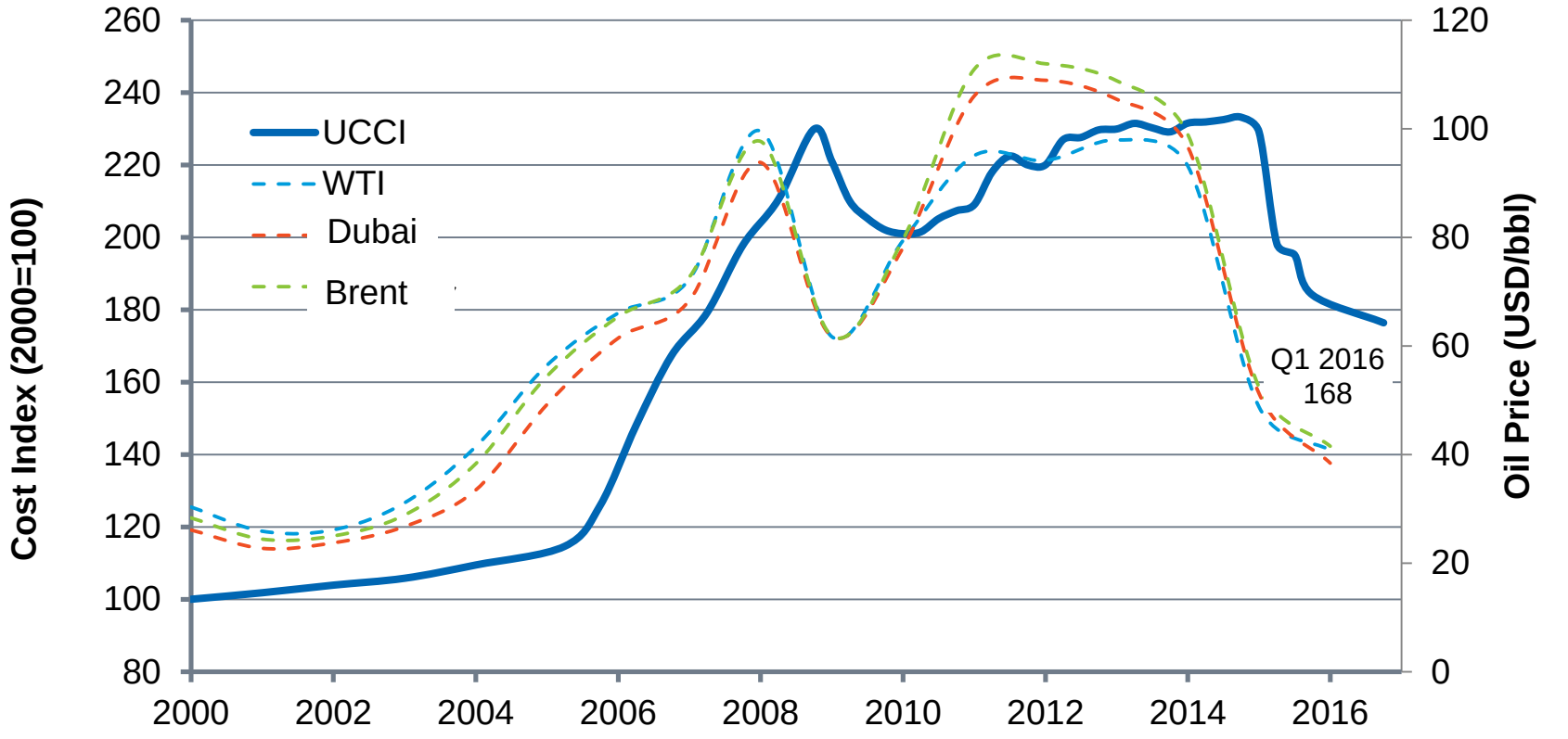


Before zero-flare operation　After zero-flare operation

(Reference) Trends of development costs

✓ Costs including rigs declined gradually associated with falling oil prices.

Upstream Capital Cost Index



Source: IHS Energy

UCCI: Index of capital cost for upstream business, with 2000 as 100. Includes rig costs, etc.

(Reference) History of Oil E&P in the Cosmo Energy Group

	Abu Dhabi	Qatar
1967	Acquired concession of Mubarraz Oil Field	
1968	Established Abu Dhabi Oil Company (ADOC)	
1970	Concluded a concession agreement with El Bunduq Oil Field. Established United Petroleum Development (UPD).	
1973	ADOC began production at Mubarraz Oil Field	
1975	UPD began production at El Bunduq Oil Field.	
1979	ADOC acquired concession for AR Oil Field.	
1988	ADOC achieved production volume of 100 million barrels. ADOC acquired concession for GA Oil Field.	
1989	ADOC began production at AR Oil Filed.	
1995	ADOC began production at GA Oil Field.	
1997		Acquired concession for Al Karkara Oil Field/ A-Structure North Field. Established Qatar Petroleum Development (QPD).
2001	ADOC began zero-flare operation.	
2005	ADOC achieved production volume of 200 million barrels.	
2006	UPD achieved production volume of 200 million barrels.	QPD began production in both oil fields.
2007		Acquired concession for Block 3/11 concession area.
2011	ADOC renewed concession/acquired a new concession area.	
2017	ADOC will begin production at Hail Oil Field (planned).	

1971 UAE founded

1973 Fourth Middle Eastern War ⇒First oil crisis

1978 Iranian Revolution ⇒ Second oil crisis

1980 Iran-Iraq War

1991 Gulf War

2003 Iraq war

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All statements other than statements of historical fact may be forward-looking statements. Statements concerning proven and probable reserves and resource estimates may also be deemed to constitute forward-looking statements and reflect conclusions that are based on certain assumptions that the reserves and resources can be economically exploited. Any statements that express or involve discussions with respect to predictions, expectations, beliefs, plans, projections, objectives, assumptions or future events or performance (often, but not always, using words or phrases such as "seek","anticipate", "plan", "continue", "estimate", "expect, "may", "will", "project", "predict", "potential","targeting", "intend", "could", "might", "should", "believe" and similar expressions) are not statements of historical fact and may be "forward-looking statements". Forward-looking statements involve known and unknown risks, uncertainties and other factors that may cause actual results or events to differ materially from those anticipated in such forward-looking statements. The Company believes that the expectations reflected in those forward-looking statements are reasonable, but no assurance can be given that these expectations will prove to be correct and such forward-looking statements should not be unduly relied upon. The Company does not intend, and does not assume any obligation, to update these forward looking statements, except as required by applicable laws. These forward-looking statements involve risks and uncertainties relating to, among other things, changes in oil prices, results of exploration and development activities, uninsured risks, regulatory changes, defects in title, availability of materials and equipment, timeliness of government or other regulatory approvals, actual performance of facilities, availability of financing on reasonable terms, availability of third party service providers, equipment and processes relative to specifications and expectations and unanticipated environmental impacts on operations. Actual results may differ materially from those expressed or implied by such forward-looking statements.