JCM Feasibility Study (FS) 2015

"Introduction of co-generation and solar power generation system in large shopping malls"

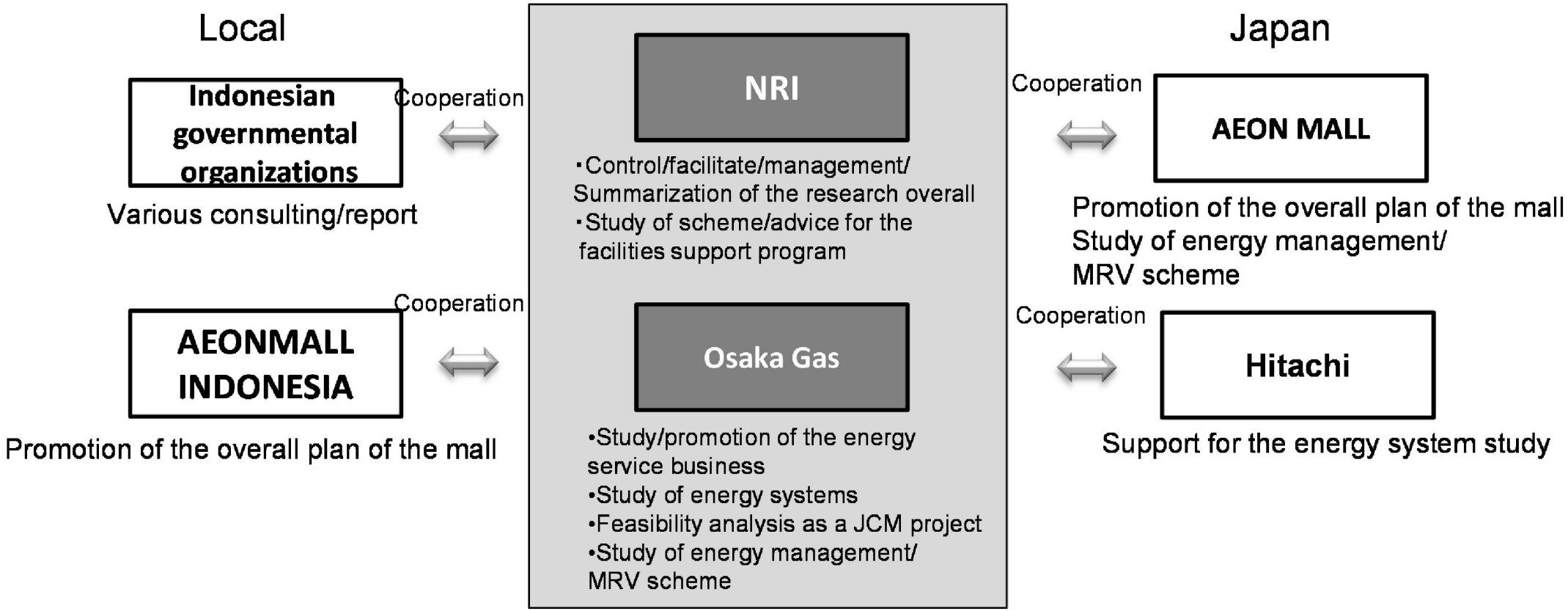
Table of contents

1. Overview of JCM FS
   a. F/S scheme
   b. Project location
   c. Description of the technology
   d. Indonesia partner
   e. Project details
2. Reference scenario
3. Monitoring methods
4. Quantification of GHG emissions and their reductions
5. MRV methods
6. Capacity building plan that can be delivered to Indonesian partner(s)
7. Next step

Nomura Research Institute, Ltd.
Osaka Gas Co., Ltd.
AEON MALL Co., Ltd.
PT. AEON MALL Indonesia
Hitachi, Ltd.

1. Overview of JCM FS/ a. FS Scheme

The role of entities in Feasibility Study



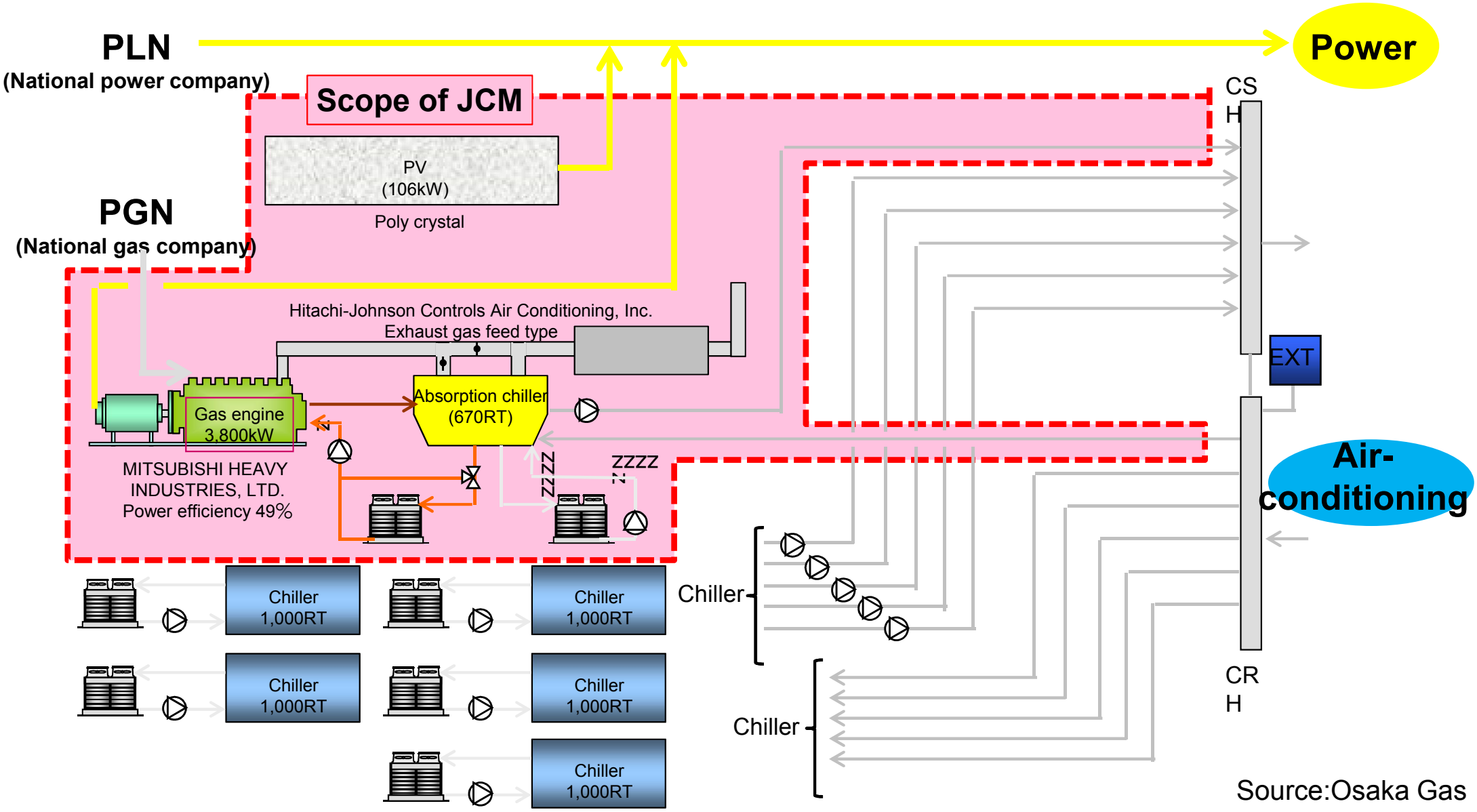
1. Overview of JCM FS/ b. Project location

The construction site is in Delta Mas City, Bekasi, about 37km from Jakarta

Source:GIIC leaflet

1. Overview of JCM FS/ c. Description of the technology

The project technology consists of cogeneration system and PV



Source:Osaka Gas

1. Overview of JCM FS/ c. Description of the technology

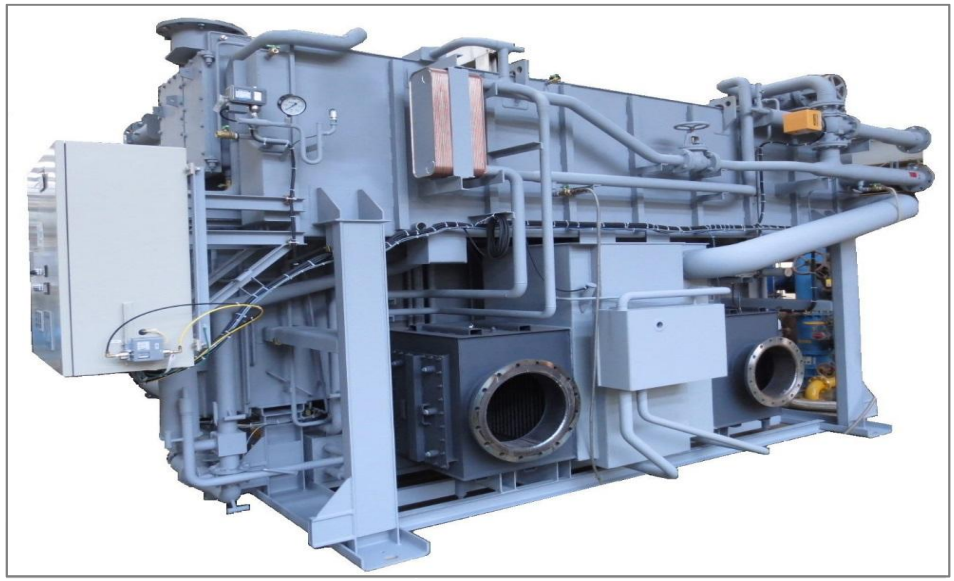
The project technology consists of cogeneration system and PV

Gas Engine generation

Maker	MITSUBISHI HEAVY INDUSTRIES, LTD.
Output	3,800kW
Frequency	50Hz
Rotational speed	750m^{-1}
Size	(L) 9.85m x (W) 3.18m x (H)4.98m
weight	40ton
Nox	320ppm@0%O$_2$
generation efficiency	49%
Gas Consumption	731m3(N)/h (* LHV:38.1MJ/m3(N))

Comparative Advantage

Absorption Chiller



Maker	Hitachi-Johnson Controls Air Conditioning, Inc.
Absorption manner	Exhaust gas and hot water input
Output	2,356kW（670RT）
Cold water temperature	7-15℃
Cold water flow rate	253m3/h
Coolant temperature	32-37℃
Jacket water temperature	88-83℃
Power supply	380V/50Hz/3ph、25kVA
Size	(L) 8.1m x (W) 3.3m x (H)3.5m
Weight	32ton

Higher efficient than hot water Input only

* The specification might be changed without notice by improvement of the products.

1. Overview of JCM FS/ d. Indonesia partner

The project counterpart in Indonesia is Joint company of AEONMALL and Sinarmas Land

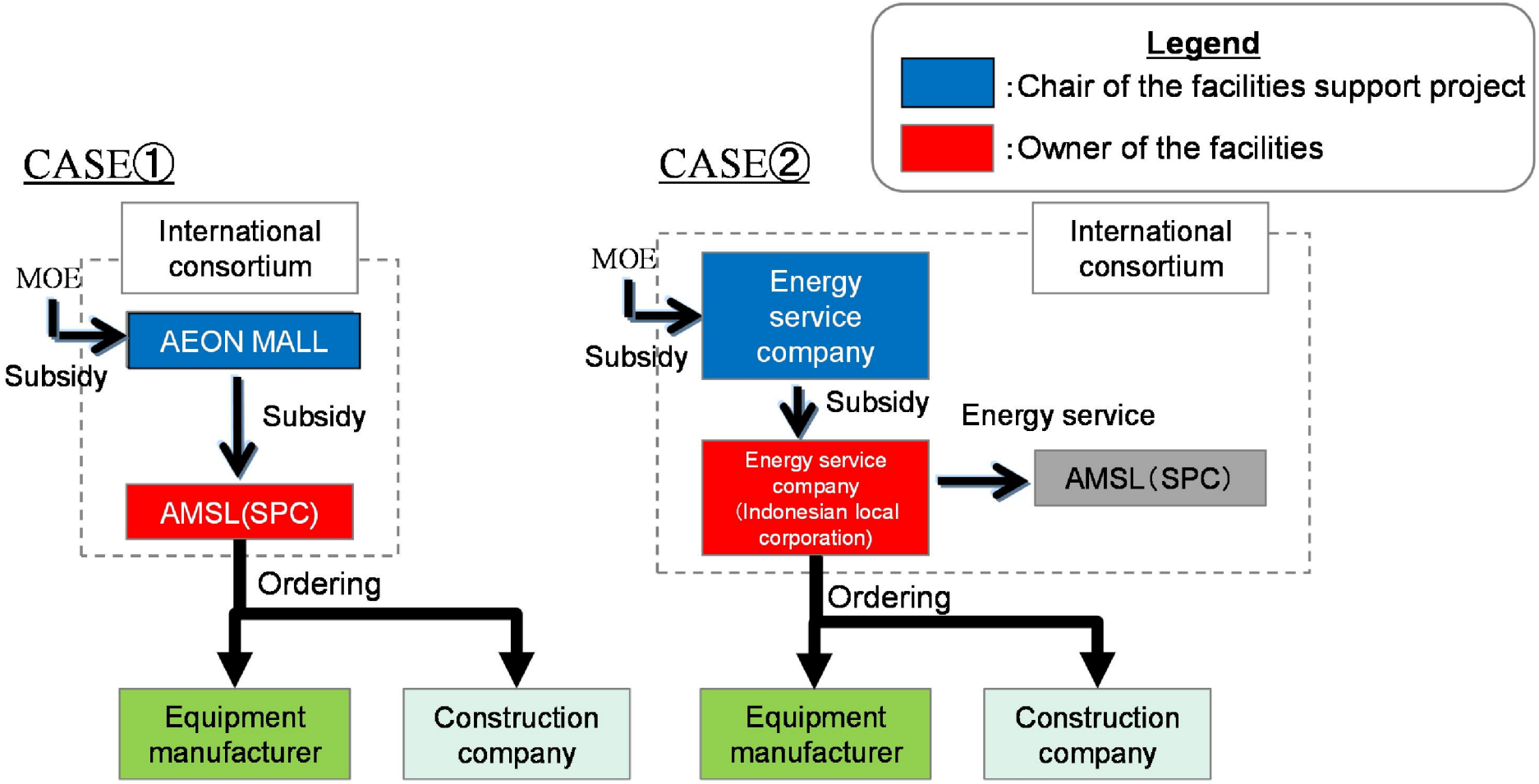
Name	PT. AMSL DELTA MAS
Date of Foundation	26 / 3 / 2013
Capital fund	US$ 61,310,000
Shareholder	AEONMALL INDONESIA 67% PSP (a subsidiary of Sinarmas Land) 33%

1. Overview of JCM FS/ e. Project details

2 case are under investigation for the project scheme.

CASE ① AMSLD owns and operates the system.

CASE ② The third party energy service company owns and operates the system.



1. Overview of JCM FS/ d. Project details

Payout time is 5.7 years if the project got a subsidy of MoE.

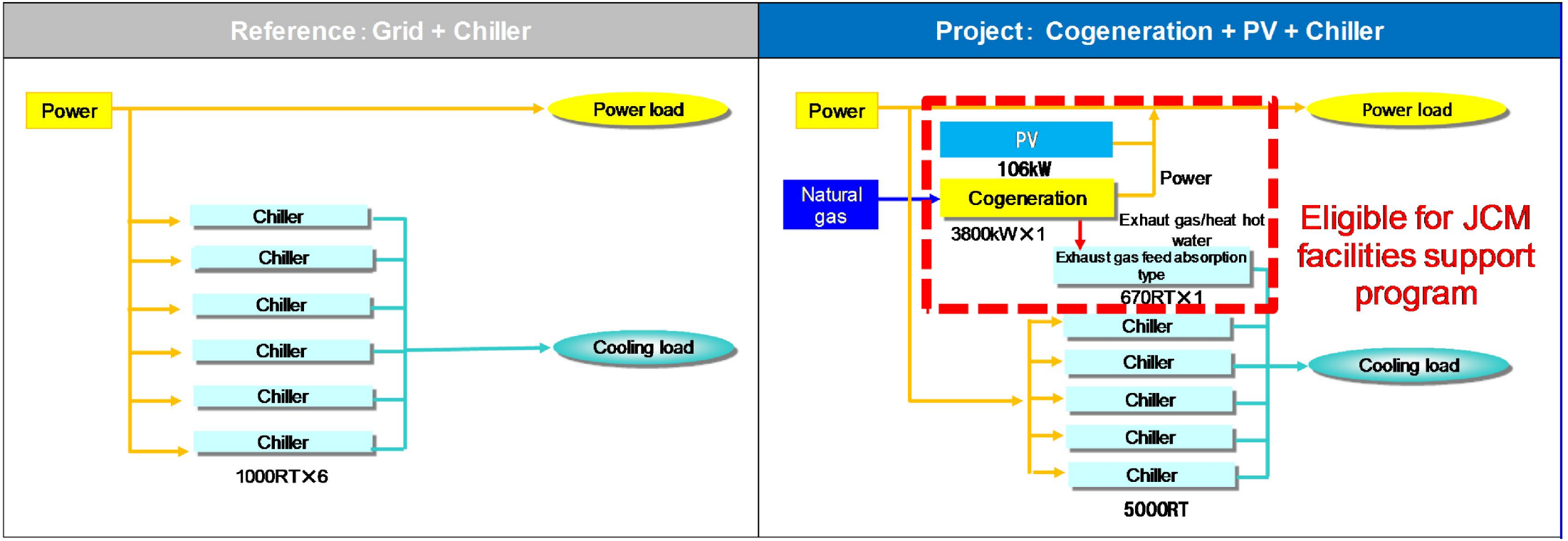
		REFERENCE	PROJECT
Initial cost		¥993millions	With support ¥1,355millions*3 Without support ¥1,730millions*2
Yearly running cost *1		¥555millions	¥456millions
Payout time	With Subsidy support	Standard	5.7 years
	Without support	Standard	9.5 years

*1 Running cost for whole building
*2 1,730M is whole initial cost and 937M is for project boundary of JCM.
*3 A support rate of 40% for project boundary was used.

2. Reference scenario

BAU consists of 6 chillers, REFERENCE: 6 turbo chillers, PROJECT: Cogeneration, PV and 5 turbo chillers.

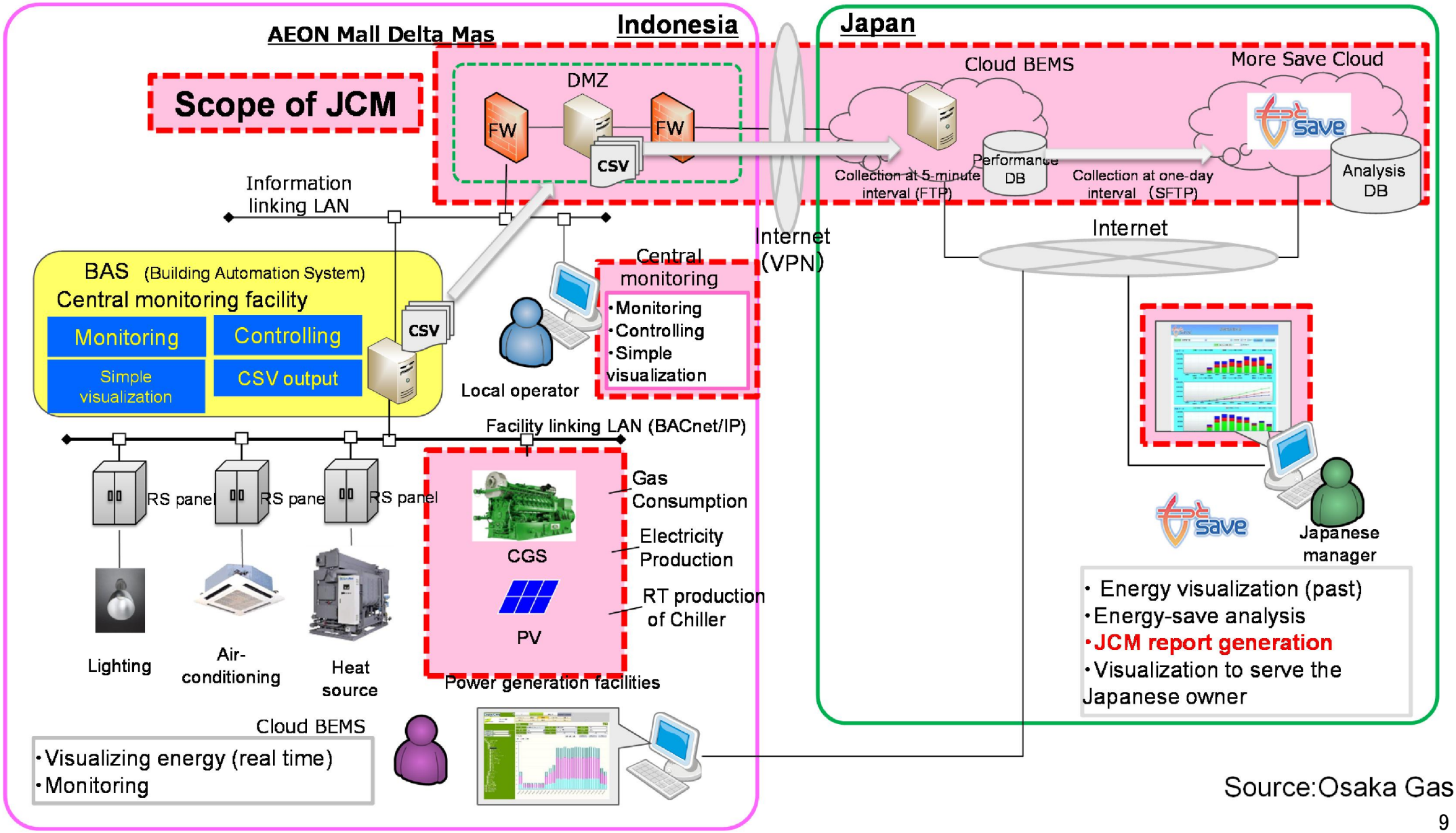
- BAU equipment is consisted of 6 chillers and REFERENCE equipment is consisted of 6 turbo chillers.
- Project is consisted of cogeneration, PV and Chiller.



Source:Osaka Gas

3. Monitoring methods

Monitoring will be conducted by AMSLD or Energy management company with BEMS

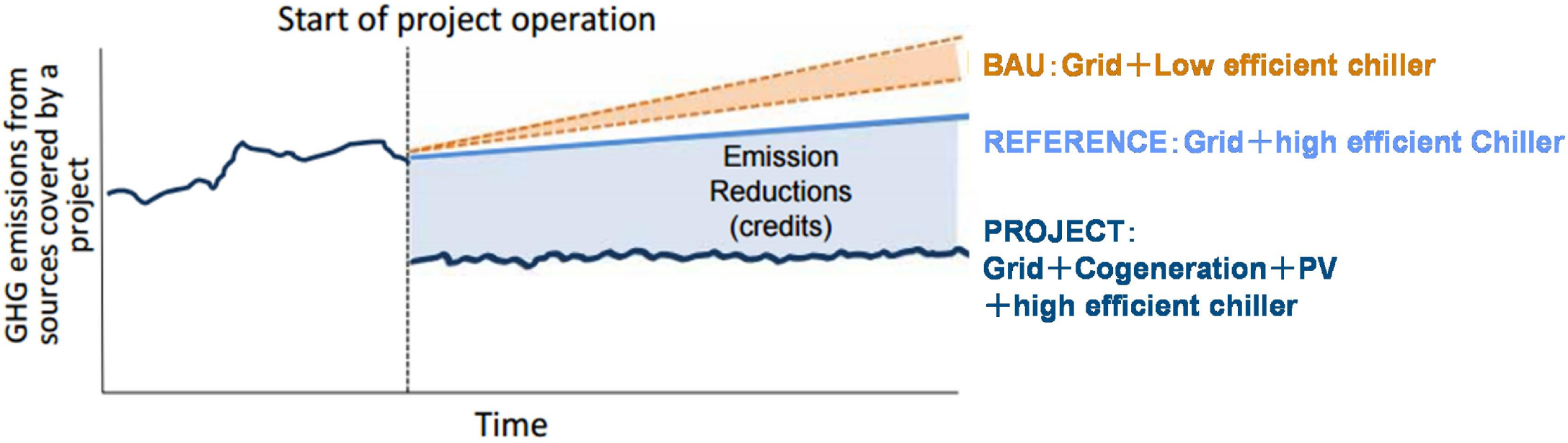


Source:Osaka Gas

4. Quantification of GHG emissions and their reductions, 5. MRV methods

Emission reduction is 9,161 t-CO_2

- REFERENCE emission: 33,333 t-CO2
- PROJECT emission: 24,172 t-CO2



6. Capacity building plan that can be delivered to Indonesian partner
Transferring Management knowhow of shopping-mall and energy management systems.

AEON MALL Co.,Ltd.

Management knowhow	
Mall Management ✓ Design ✓ Attract tenants ✓ Customer Relations ✓ PR etc.,	Energy Management ✓ Handling cogeneration system ✓ PDCA management through BEMS etc.,

AMSLD

7. Next steps,

We continue to study, aiming for applying for the facilities support program 2017.

Whole project schedule