NSET

Seminar on the Joint Crediting Mechanism (JCM) Implementation in Thailand – Further Contribution to GHG Emission Reductions in Thailand through the JCM –

Session 3. JCM Financing Programme and Case Example of the JCM Implementation: Introduction of Biomass Co-generation System to Chemical Factory (Selected in 2024)

NS-OG ENERGY SOLUTIONS (THAILND) LTD. (NSET)

19th December 2024

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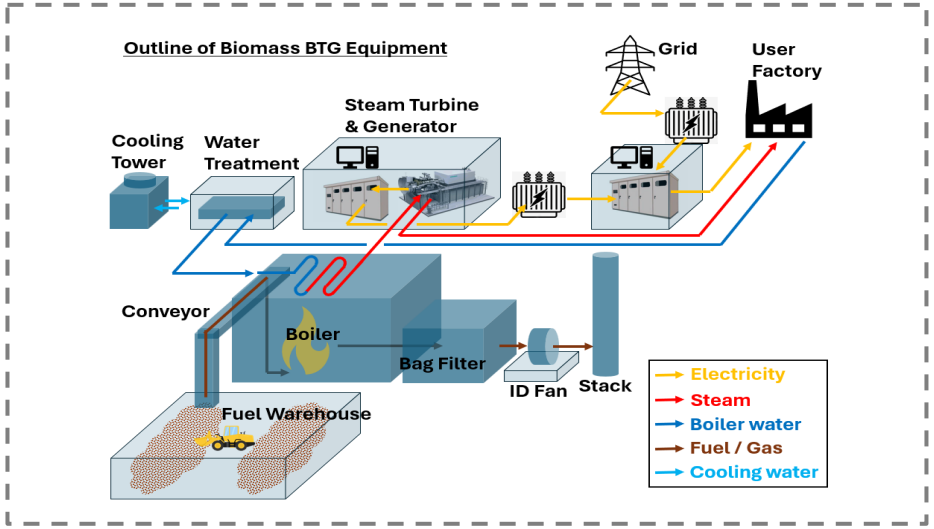
Project Title : Introduction of Biomass Co-generation System to Chemical Factory

PP (Japan):NIPPON STEEL ENGINEERING CO., LTD. PP (Thailand):NS-OG ENERGY SOLUTIONS (THAILAND) LTD. 、
THAI NIPPON STEEL ENGINEERING & CONSTRUCTION CORPORATION, LTD.

Outline of GHG Mitigation Activity

This project introduces biomass co-generation system to a chemical factory in Rayong. The generated electricity and steam are supplied to a chemical factory and another in adjacency.

This project reduces greenhouse gas (GHG) emissions by replacing part of the electricity from the fossil fuel-derived grid power and part of the steam from the fossil fuel burning boiler with power and steam from renewable sources.



Expected GHG Emission Reductions

48,429tCO₂/year

=Reference CO_2 emissions - Project CO_2 emissions

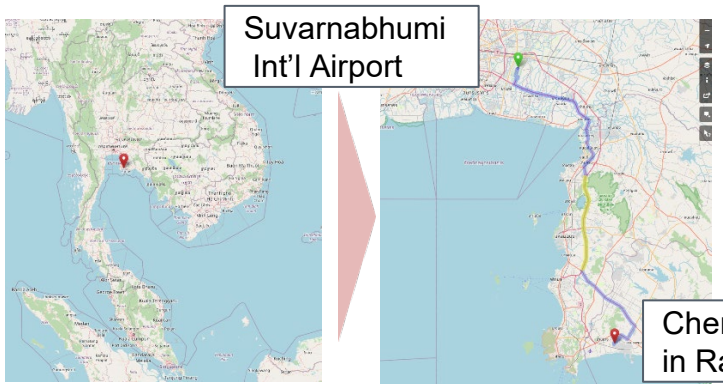
・Reference CO_2 emissions [tCO_2/year]

= (Quantity of the electricity generated by the project) [MWh/year] × Emission factor [tCO_2/MWh]+(Provided steam heat value) [GJ/year] × Emission factor [tCO_2/GJ]

・Project CO_2 emissions [tCO_2 /year]

= (CO_2 emissions by on-site consumption of fossil fuel for operating a biomass power plant)[tCO_2 /year] + (Transportation activity of solid biomass fuels from collecting sites to a biomass power plant) [GJ/year] × Emission factor [tCO_2/GJ]

Sites of Project



Approx 150km south of Bangkok Suvarnabhumi International Airport

@OpenStreetMap contributors. Tiles Courtesy of Andy Allan.

Who we are?

"NSET" is a JV company of Nippon Steel Engineering(70%) and Osaka-gas(30%)

Conducting Industrial Solution Businesses(DX, Carbon Neutral(=GX), factory development, energy saving) in Thailand.

Nippon Steel Engineering is a leading company of WtE power plant, Steel Plant and Gas Co-Generation Engineering in Japan.

Osaka-gas is a leading company of Energy Supply Business(NG, Power etc) and develop of renewable energy plant such as biomass in Japan.

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Who We Are

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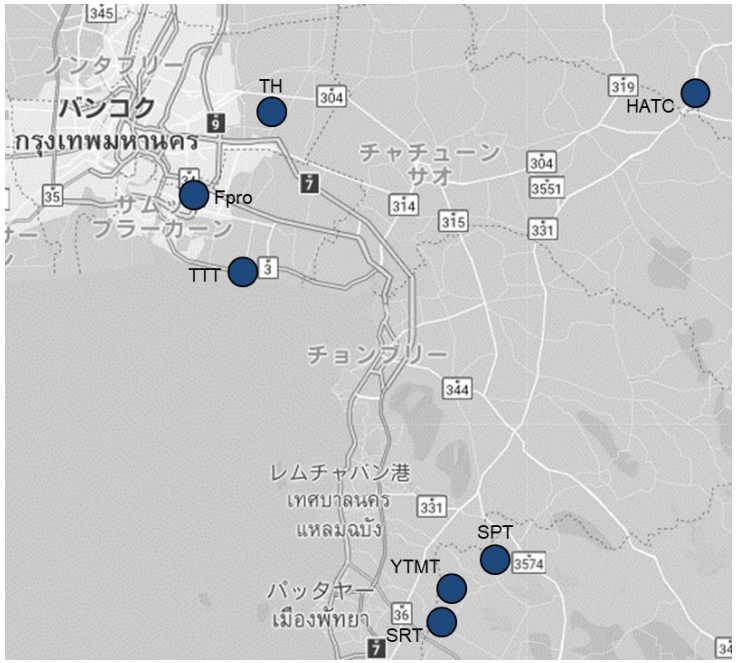
Who we are? - Company Information -

Company	NS-OG Energy Solutions (Thailand) Ltd. “NSET”
Establishment	June 2012
Revenue	Approx. 1,000 MMTHB
Core business	① Production and supply of heat and power by CHP*1 facility
	② O&M*2 of clients’ utility facility such as boiler, chiller and other utility facilities
	③ Energy visualization of clients’ utility facility
Shareholders	Nippon Steel Engineering (70%)
	Osaka Gas Singapore (30%)

	Customer	Main equipment			Biz model	COD
		Gen	Boiler	Chiller		
HATC	Honda Automobile （Thailand)	-	4 t/h	3,000RT	②	2015
TTT	Toray Textiles (Thailand)	7 MW GT	41 t/h	-	①	2016
YRT	Yokohama Tire Manufacturing (Thailand)	7 MW GT	25 t/h	600RT	①	2017
HATC2	Honda Automobile （Thailand)	7 MW GE	4 t/h	800RT	①	2017
THM	Thai Honda Manufacturing	7 MW GE	4 t/h	1,500RT	①	2018
SPT	Spiber (Thailand)	-	12 t/h	2,000RT	②	2020
SRT	Sumitomo Rubber（Thailand)	-	66t/h	-	③	2023
Fpro*3	District Cooling System	-	-	10,000RT	②	2025



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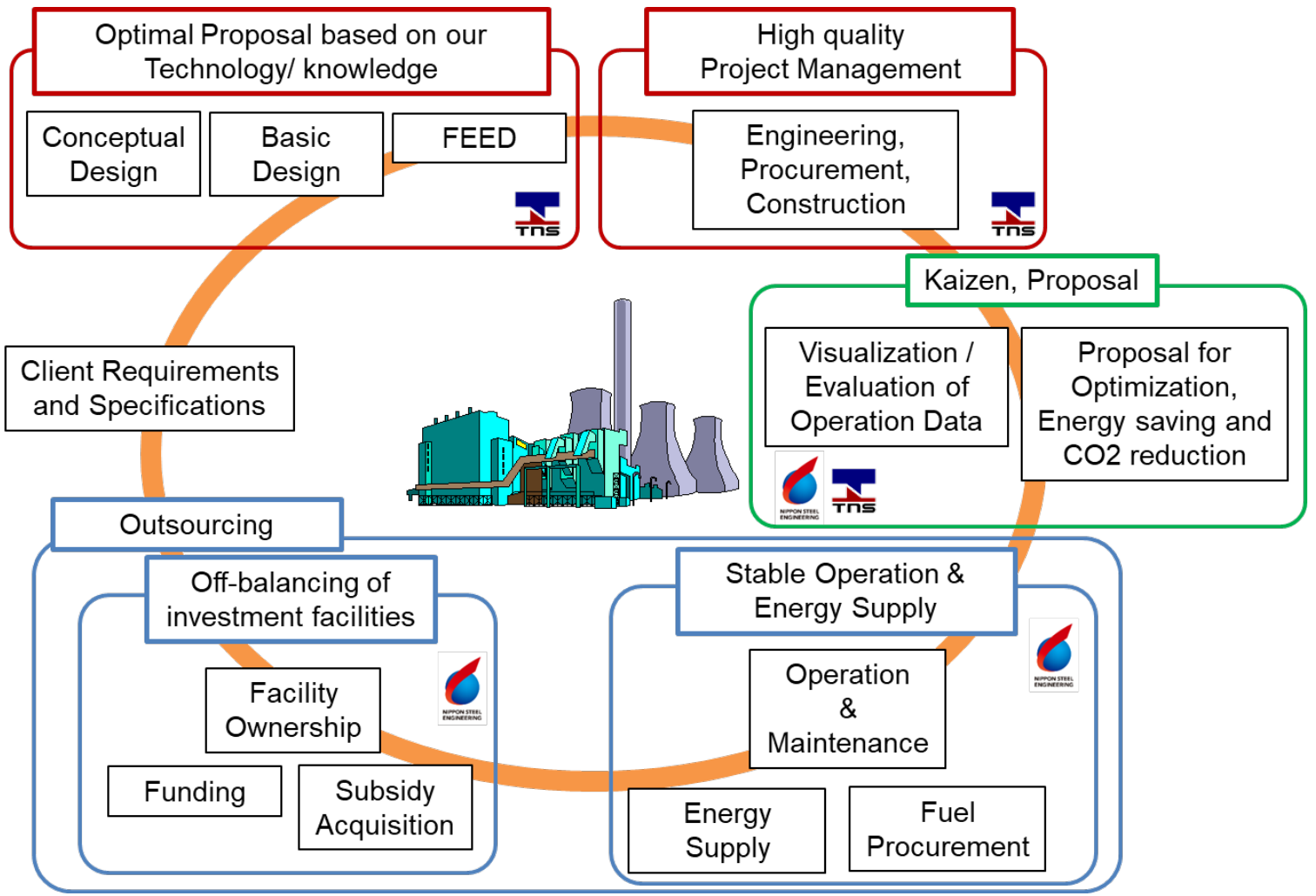
Who we are? – One Stop Service -

NSET offers "One Stop Service" with THAI NIPPON STEEL ENGINEERING & CONSTRUCTION CORPORATION, LTD. (TNS)



➢ TNS：Full Service for EPC(Onshore and Offshore)

EPC

One-stop EPC service provider in Onshore and Offshore.

1987	No.1	900+	30+
Established	Wellhead Platform Share in Thailand Over 200 Nos delivered	Professional staffs	Project Management Professionals

THAI NIPPON STEEL ENGINEERING & CONSTRUCTION CORPORATION LTD.

Nippon Steel Engineering	47%
Nippon Steel Trading	3%
ITD Group	50%

Feasibility Study	Conceptual Design	Front End Engineering Design
Detail Engineering	Procurement & Sourcing	Fabrication & Construction
Transportation & Installation	Hook Up & Commissioning	Advance analysis
As built Survey & 3D Modeling	Operation & Maintenance	
Decommissioning		

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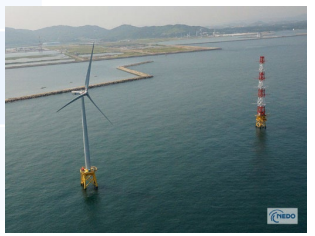
Who we are? – NSE`s carbon neutral power related products-

Offshore wind farm

NSE has involved in BOP's EPCI for offshore wind business with 50 years experiences as EPCI contractor for offshore projects of Oil & Gas, marine/port facilities.

Location	Operation start	Foundation	Output / Scope
Fukuoka Pref.	2013	Jacket + gravity	2MW / EPC
Fukushima Pref.	2015	Floating	7MW / Installation of anchor chain
Hokkaido Pref.	2023	Jacket	Total 112MW (8MW*14) / EPCI (Foundation)
Fukuoka Pref.	2026	Jacket	Total 237.5MW(9.6MW*25)/ EPCI (Foundation)



Waste to energy plant

NSE has designed and constructed, and been operating of total of 55 waste to energy plants in Japan.The electricity generated from the waste heat is a " local production for local consumption" power source providing stable and clean energy.

Geothermal steam production facility

NSE has been participating in the construction of geothermal power facilities since the 1980s, aiming for coexistence with nature.
NSE has been responsible for the construction of steam production equipment and pipelines on 10 plants of the 17 large-scale geothermal power plants in Japan.

Biomass power generation

NSE has also actively engaged in the construction and operation of biomass power generation facilities, which have attracted attention as low-carbon power sources in recent years.

Location	Operation start	Foundation	Output / Scope
Fukuoka pref.	2021	EPC	**75MW、Wood pellet, Wood chip, PKS**
Hyogo pref.	2023	EPC,O&M	**75MW、Wood chip, PKS**
Shizuoka pref.	2024	EPC	**75MW、Wood pellet、PKS**
Saga pref.	2024	EPC	**75MW、Wood pellet、PKS**

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Who we are? – Osaka Gas`s knowledge of Power Plant Developments and Operations

Osaka Gas（OG） is Gas and Power Supply Company in Japan, and also OG has the wide experience to develop and operate Natural Gas and Biomass Power Plant (Biomass:11 include mixed firing), On-site Business etc in Japan

Osaka-Gas

India

Osaka Gas India

Energy Saving

Thailand

Osaka Gas(Thailand)
OGP Energy Solutions
NS-OG Energy Solutions
OE Solar

Vietnam

Sojitz Osaka Gas
Energy Company

Singapore

Osaka Gas Singapore
City-OG Gas Energy Services
AGP International Holdings

Indonesia

OSAKA GAS INDONESIA

OG has the wide variety of business portfolio abroad especially in Asia.

In Thailand, OG has the JV company with PTT, which is called as OGPS to support factories in the comprehensive utilities business by supplying natural gas pipelines.

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Introduction of Biomass Co-generation System to Chemical Factory (Selected in 2024)

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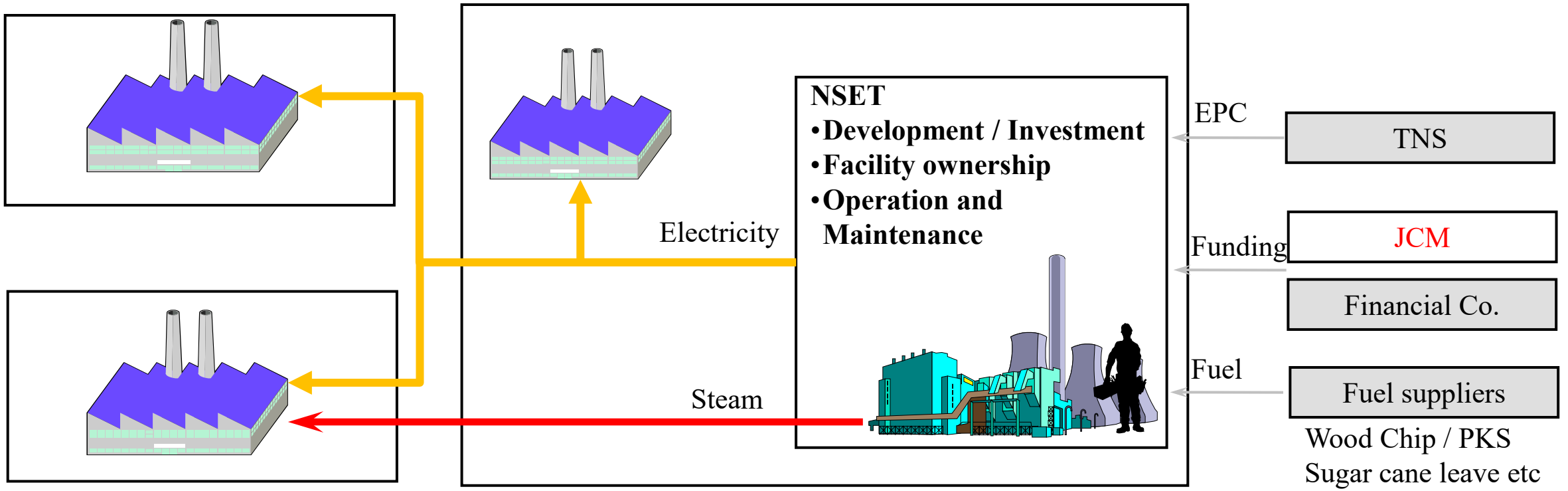
Rough Picture of Biomass Co-generation System Installation Project (Selected JCM in 2024)

Clients outsource Planning, Operation and Maintenance work of Biomass Co-generation system to NSET to achieve GX(Green Transformation). Clients can focus their resources on the core of their production.

Factory Benefit

- Reduction in utility costs
- Reduction in CO2 emission reduction
- Save Resources(the investment fund and Human resources)



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Wood Chip Image

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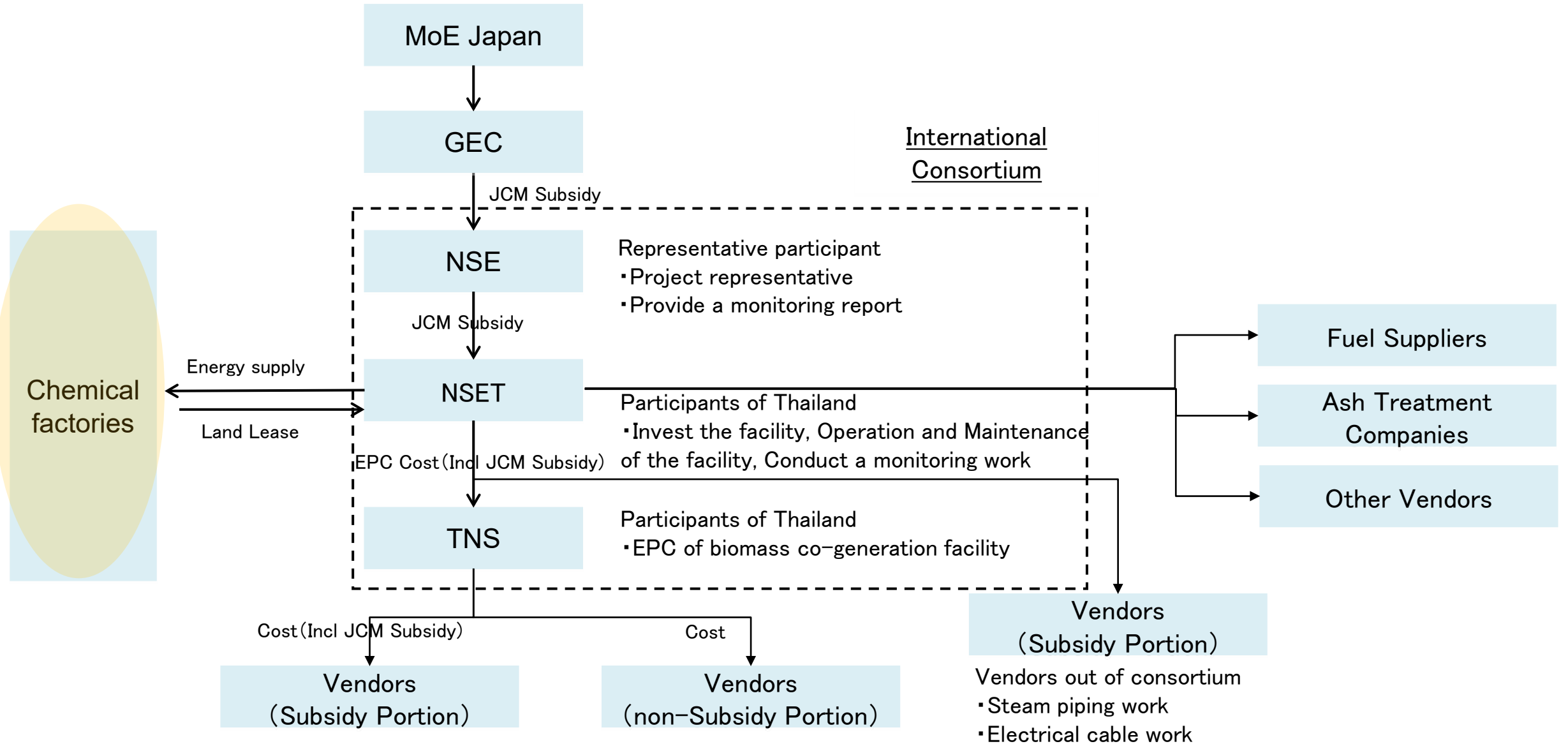
Project Structure



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The Important Point for the development and implementation of this project

Development Phase

◆Schedule Arrangement

- JCM schedule has the limit of the project period, and
- The necessary licenses for the Power Plant(Especially Biomass) are various,
- owner shall arrange the schedule considering the license schedule in Thailand and JCM schedule in Japan.(including CoP and IEE report after public hearing)

◆Partnership development especially for fuel procurement

- Regarding to the procurement of Fuel, the partnership with the Thai company is necessary.
- Since the project period is 20yrs, NSET sought the trustworthy and capable company with intimate communication not only negotiation.

Implementation Phase

◆Comply with the Schedule(Project Management)

- As the multiple works will progress during the construction period, NSET, Client and EPC contractor should cooperate to comply with the schedule.
- Advanced document preparation and communication with government officers are important.

◆Communication with Partners and Proactive Fuel sourcing(including new fuel test)

- Since the fuel procurement work procedure will be complicated, frequent communication with partner is necessary especially for the delivery.
- Sourcing the new fuel proactively and conduct the test to investigate the effect of the stable operation of the Power Plant, and this can be the knowledge in the future.

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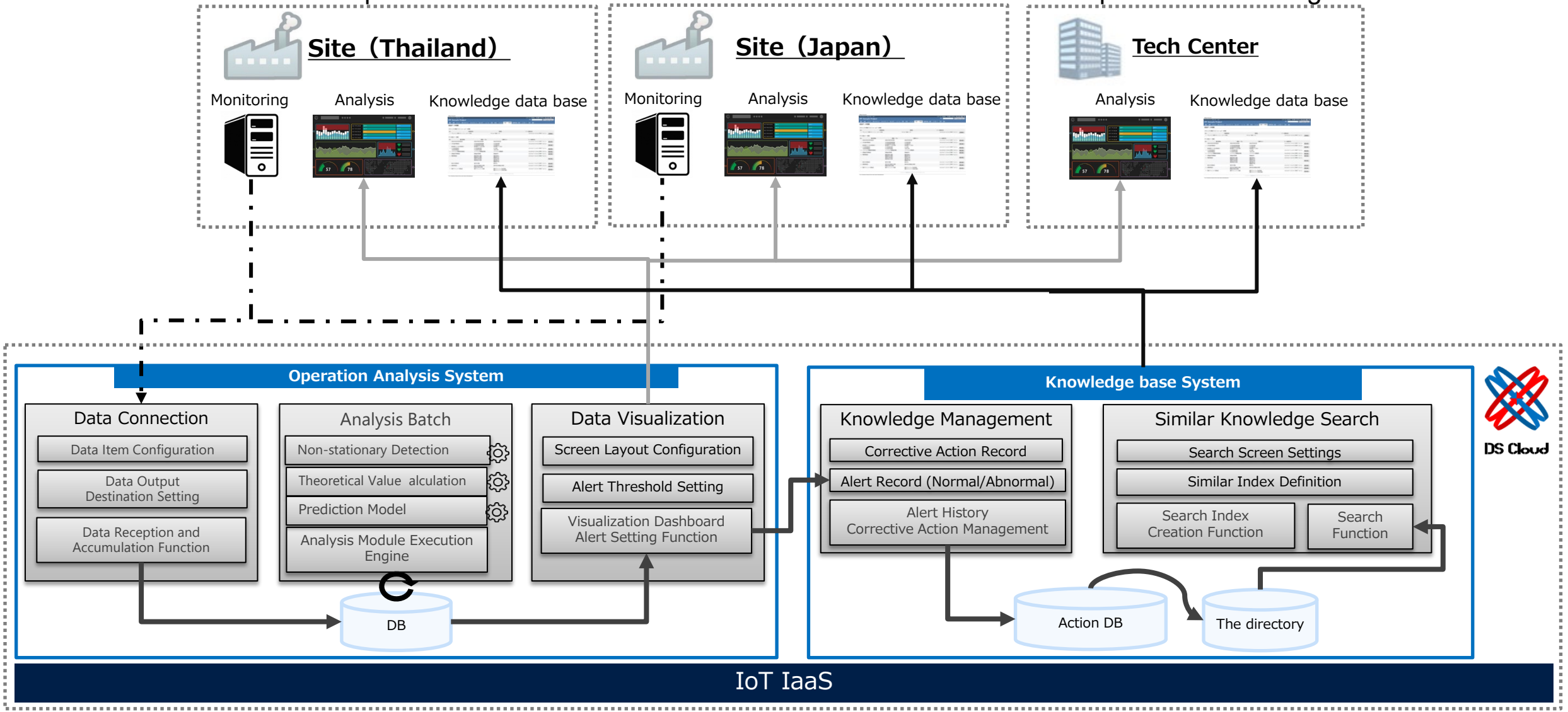
The improvement for the operation with the “AI”

NSET will utilize NSE`s latest Operation system for the stable biomass operation and will keep developing our knowledge to make our operation better and contribute to Thailand with this Biomass Operation Knowledge.



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Points of NSET`s Biomass Energy Facilities(How NSET contribute to Thailand Biomass)

High Stability

Utilizing the **WtE and Biomass Engineering knowledge for the design of Biomass boiler.** It allows the plant have the wider range of the acceptance of Fuel. It makes the plant stability higher.

Future Improvement

As NSET is not just an investing company but engineering tech company, NSET will keep proposing the improvement solutions not only NSET Biomass Co-Gen but also clients factory energy consumption. (with **carbon capture**, etc)

With Thailand

Working with **Thai facility makers and construction companies.**
Procure Biomass in Thailand especially near the project site.

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Reference : Carbon Capture Project in Japan

Client: **AIR WATER CARBONIC INC.**

- Installation Site: Muroran City, Japan
- Installed capacity: **120 ton-CO2/d**
- Feed stock: **Hot Stove Gas**
- Applications of the products:
  - Welding
  - Carbonated beverage
  - Dry ice, etc.
- Beginning of operation: **November 2014**

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End Of Presentation

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