Webinar on the Joint Crediting Mechanism (JCM) Implementation in Indonesia
- Innovation for Carbon Neutrality through JCM -

City-to-City Collaboration Project to realize SDGs future city
by Toyama City, Bali Province and Semarang City

2nd September 2021

エネルギーと環境を考える
JANUS
日本エヌ・ユー・エス株式会社

Agenda

1. Company profile
2. Introduction of related cities
3. Project purpose and implementation system
4. Outline of the project (Bali and Semarang)
5. Progress and future action plans (Bali and Semarang)
6. Survey for hydrogen technology development in Bali
7. Challenges and countermeasure

1. Company profile

Japan NUS Co., Ltd.

エネルギーと環境を考える
JANUS
日本エヌ・ユー・エス株式会社

- ✓ Our expertise: Consultancy services in Energy and Environment business field
- ✓ Established in 1971
- ✓ About 200 employees (March 2020)
- ✓ JGC HD (Japanese oil and gas EPC) group company

JGC
PT JGC INDONESIA

Our Expertise

Track records of JCM related project

- 2014 JCM Feasibility Study “3.7 MW Run-of-river Small Hydropower“
- 2018 JCM project of CNG mixed combustion of public transportation in Semarang City, Indonesia
- 2019 Infrastructure development research project for JCM project (Banda Aceh and Tebing Tinggi City)
- 2020 City-to-city collaboration to realize a zero-carbon society in Bali, Semarang in Indonesia/ Iskandar, Kota Kinabalu in Malaysia/Male in Maldives

2. Introduction of Related Cities

都市の理想を、富山から。 SDGs未来都市 TOYAMA — Cooperation — Bali — Semarang

Toyama City

都市の理想を、富山から。 SDGs未来都市 TOYAMA

- Known as an **"Environmental Future City"** and **"SDGs Future City"**
- Highly acclaimed for its achievements in the development of **compact city through public transportation and the use of renewable energy such as small hydropower**, certified as an "improving energy efficiency city".
- Has a track record of introducing low-carbon technology with Semarang City through the implementation of City-to-City Collaboration and the JCM subsidy project.

Bali Province

Main Experiences for JCM/City-to-city collaboration project

-**2014: Started cooperation with Toyama City** under the cooperation agreement for sustainable energy supply

-2017: Cooperation agreement for environment management between Toyama City

- Willing to address air pollution mainly caused by transportation sector in its province and tries to reduce GHG emission.
- Has a goal to disseminate renewable energy from 0.27 % in 2015 to 11.5 % in 2025 based on "General plan of regional energy for the province of Bali 2020-2050".

Semarang, Central Java

Main Experiences for JCM/City-to-city collaboration project

-**2014: Selected as "100 Resilient City"** proposed by Rockefeller Foundation.

-2018: Conducted JCM subsidy project "Introduction of CNG-Diesel Hybrid Equipment to Public Bus in Semarang"

- Aims to reduce GHG emission by 29 % from BaU scenario by addressing the improvement of energy consumption in industries, commercial and residential use.
- **Conducted the JCM project, "Introduction of CNG-Diesel Hybrid Equipment to Public Bus in Semarang" with Toyama City in 2018.**

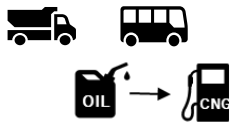
3. Project purpose and implementation system

Project Purpose

Toyama City, Toyama local companies, and the cities in Indonesia (Bali, Semarang) cooperate to **conduct the feasibility study mainly for formulation of JCM project** as below;

① Transportation fuel conversion project

utilizing CNG and diesel co-firing (DDF) technology



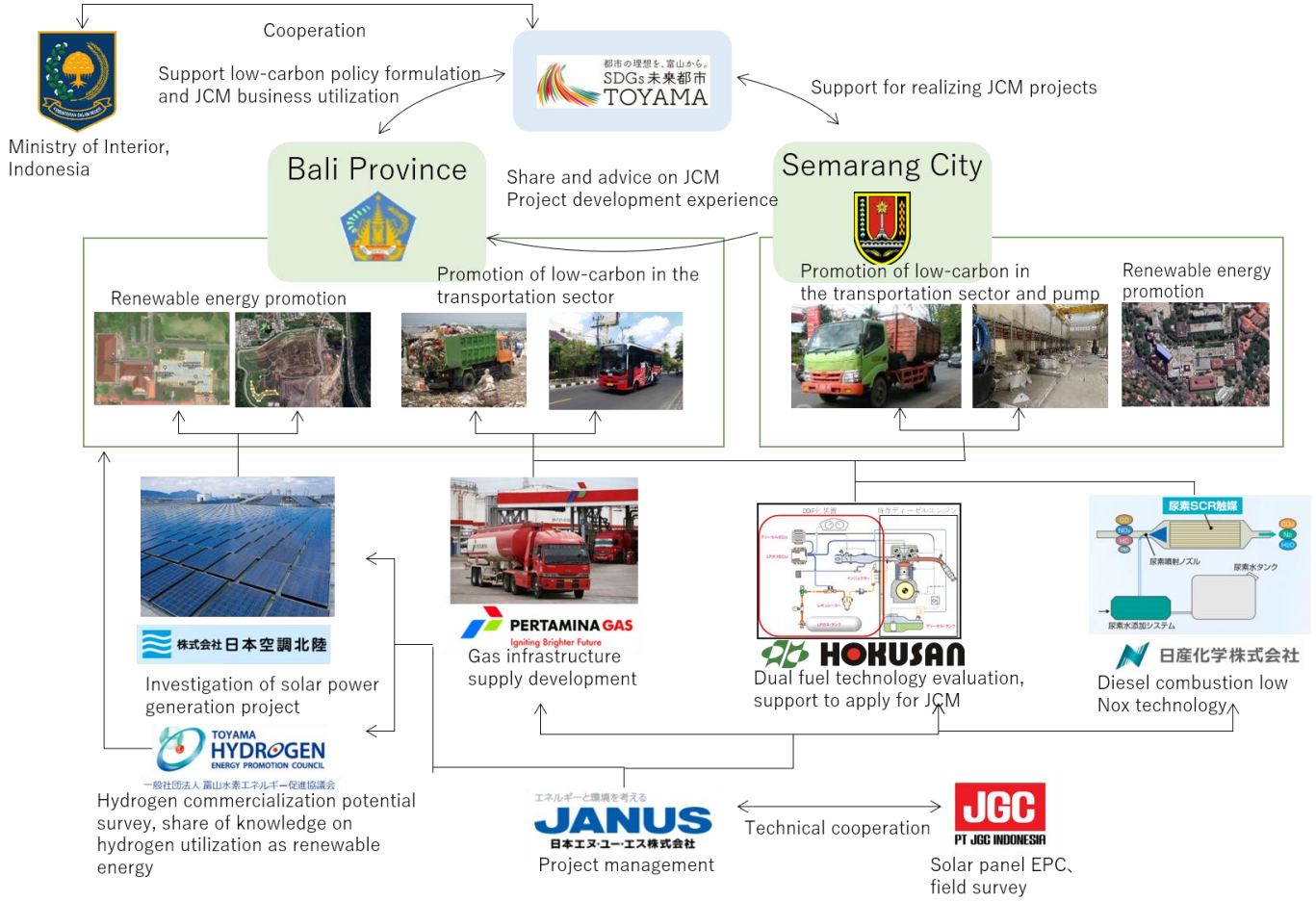
② Solar power generation project

focusing on government facilities

③ Hydrogen technology development survey

in Bali (from this year)

Implementation system



4. Outline of the project (Transportation fuel conversion)

① Transportation fuel conversion by DDF (DDF Project)

Fuel conversion potential

- **Diesel is still consumed as main transportation fuel** in Bali and Semarang which causes air pollution and large amount of CO2 emission.
- Electricity/hydrogen are expected as future transportation fuels...
- **Natural gas consumption is recommended** in national, provincial level (ex: NDC, RUEN (Grand National Energy Plan 2015-2050)).

Outline of the project

- Select JCM candidate facilities and collect fuel consumption data
- Estimate economic effect and GHG reduction effect of DDF project

Public bus (Bali)

Garbage truck (Bali and Semarang)

Flood control pump (Semarang)

JCM candidate facilities in DDF project

DDF (Dual Diesel Fuel) system

Can be installed in half a day

Equipment to be installed

CNG tank

CNG fuel injection unit

Existing facility

Engine

No need to modify existing facilities

Both diesel and CNG are combusted simultaneously

Share DDF project know-how

Gas station has opened!! (Aug 2021)

Semarang has conducted DDF project in 2018

4. Outline of the project (Solar power generation)

②Solar power generation (Solar power generation project)

Situation of PV installation in Bali and Semarang

- Installation of PV is expected as a main renewable energy source, but very few have been installed.
  - ✓ Installed Capacity (2019):
    - ➢ Bali : **4MW** (**0.3 %** of total installed capacity of 1,200 MW)
    - ➢ Semarang: **Only 95kW**
- **PV installation to the government facility is recommended** ("Surat Edaran MESDM No. 363/22/MEM.L/2019" and "Bali independent energy development plan", etc.).

Solar panel on roof

Roof of villa type hotel

Hotels in Bali:
✓ Problems of strength of roof
✓ The industry is hit strongly by Covid-19.

Outline of the project

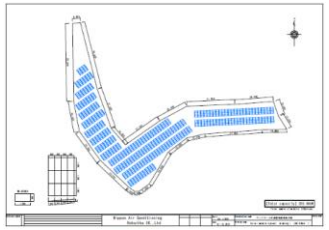
- Select the government facilities from satellite data.
- Estimate power generation, GHG reduction

Satellite image around Denpasar City

Building of Ministry of Finance, Bali Government

Water purification plant

Final Disposal site



Example of estimation:
Module capacity[kW] 285.66 kW, estimated annual power generation [kWh] 431,429 kWh

5. Progress and future action plans (Bali and Semarang)

①、② Progress and plan of the DDF and Solar power generation project

Progress and plan

FY2020

- •Establish stakeholders' relationship
- •Estimate project's effect

Completed

- Selection of JCM candidate facilities
- Estimation of economic effect
- Estimation of low carbon effect
- Knowledge sharing for policy making by Toyama city
- Consideration of project policy

Rough estimation based on assumptions.
Need more detailed estimation and plan including site survey.

FY2021

Prepare JCM project formulation

GOAL

- Determination of installation targets
- Construction of implementation system
- Preparation of JCM application documents

Strategy

- Consideration of detailed economic effect
- Discussion of JCM formulation of candidate owners
- Consideration of gas stations construction by Pertamina (*only for DDF project*)
- Consideration of PV installation scheme (*only for PV project*)

JCM project formulation

FY2022

Application of JCM project

GOAL

- Application of JCM project
- Procurement of fund, preparation of bid

Strategy

- Contract for gas supply (*only for DDF project*)
- Contract for electricity sales (*only for PV project*)
- Construction of EPC implementation system (*only for PV project*)

FY2023・2024-

Construction, Operation

GOAL

- Construction, Installation of equipment
- MRV

Action plans for this fiscal year

6. Survey for hydrogen technology development in Bali

③ Survey for hydrogen technology development

- Bali RUED (comprehensive energy plan) indicates the future energy mix.
- It aims to **expand the ratio of renewable energy and assumes most of them as solar power**.

Bali energy policy (2020-2050) (RUED)

Energy type	Unit	2015	2025	2050
1. Coal	(%)	19.6	3.3	0.0
2. Gas	(%)	4.4	56.2	34.9
3. Oil	(%)	75.7	29.3	45.0
4. Renewable Energy	(%)	**0.3**	**11.5**	**20.1**

- ✓ **PV is not a stable energy, so it is necessary to prepare backup electric power source for** adjusting fluctuations**.**
- ✓ It is considered that **hydrogen energy development is necessary,** which is not constrained by grid limitation.
- ✓ Pertamina is carrying out a demonstration project in-house, and there is a request for cooperation to proceed with studies and investigations on hydrogen energy development in Bali.

- TOYAMA HYDROGEN ENERGY COUNCIL and Toyama local companies are building **a model for local production and local consumption of hydrogen**, including the operation of hydrogen stations and fuel cell vehicles.
- They can **provide know-how and technical expertise in such hydrogen utilization technologies**.

Hydrogen station

Fuel cell truck

6. Survey for hydrogen technology development in Bali

③ Survey for hydrogen technology development (Future action plans)

FY2021

Survey for hydrogen technology development

GOAL

- Survey for hydrogen development potential
- Understanding the hydrogen development challenges

- Knowledge sharing by Toyama city about hydrogen technology installation
- Discussion with BPPT, BAPPENAS, Embassy of the Republic of Indonesia in Tokyo

FY2022～

Consideration of verification project

GOAL

- Determination of installation targets
- Construction of implementation system
- Preparation of project application documents

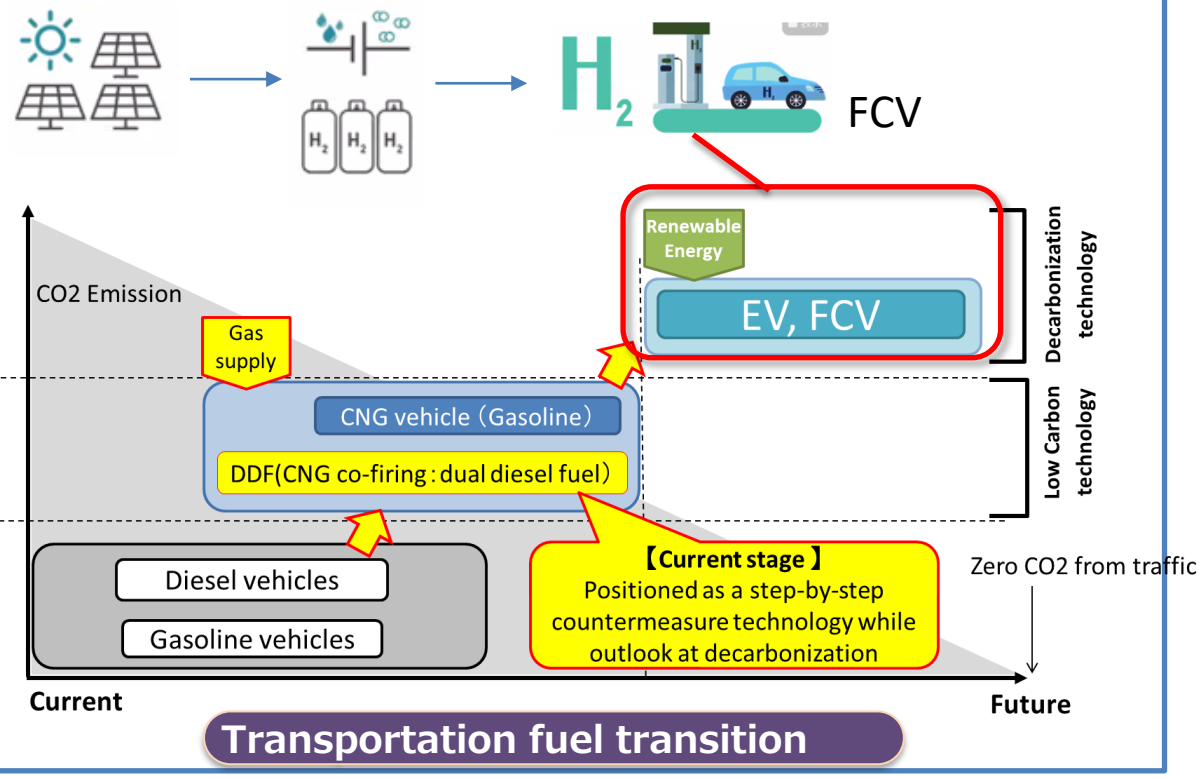
- Consideration of detailed economic effect
- Discussion of verification of formulation with candidate owners

FY2023～

Implementation of verification project

FY2025～

Dissemination in business scale (FCV, power generation)



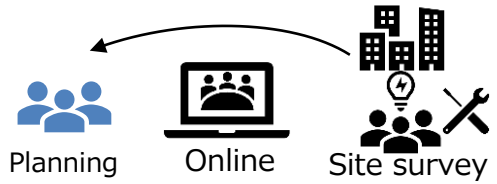
Transportation fuel transition

7. Challenges and countermeasure

The difficulty because of COVID-19

✓ Restriction of conducting site survey

→Alternative method FY2021: Online video survey with support from JGC Indonesia



Solar power project

✓ Challenges in the burden of initial investment

→Better to propose the project by solar PPA scheme.

① Initial cost: Covered by PLN
Maintenance cost: Covered by PLN
Electricity generated: Purchased by PLN

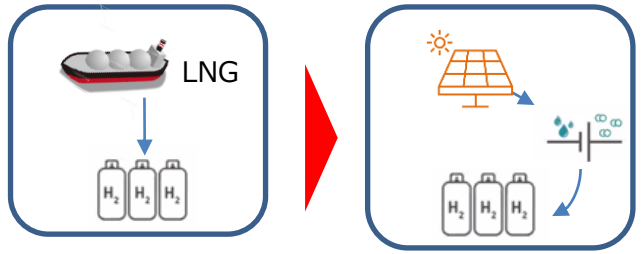
② Initial cost: Covered by PPA business entity
Maintenance cost: Determined by consultation
Electricity generated: Determined by consultation

Promising solar PPA schemes in Indonesia

Hydrogen survey

✓ Undeveloped hydrogen related to policies and plans

→ Survey for potential hydrogen technology development including gray hydrogen utilizing abundant natural gas resources in Indonesia as transition technology



Gray hydrogen
(Initial stage)

Green hydrogen

Cooperation with national stakeholders

→ Develop not only provincial, city level stakeholders, but also national level stakeholders, such as BAPPENAS (Ministry of National Development Planning of the Republic of Indonesia) and Embassy of the Republic of Indonesia in Tokyo

Thank you for your attention!

HOKUSAN

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TOYAMA HYDROGEN ENERGY PROMOTION COUNCIL

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