

# Newly developed Energy Business as a better solution for non-carbon society

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***NIPPON KOEI***

# 1. Company Profile of Nippon Koei

Established: June 1946  
Turnover: 101 billion JPY  
Employees: 4,566

## Domestic Consulting



Nippon Koei has implemented projects (about 3,000 per year) to underpin the foundations of people's daily lives, such as development and maintenance of social capital including rivers, roads, etc., and regional reforms to realize rich and safe living.

## International Consulting



Nippon Koei underpins development in the developing countries of Africa, the Middle East and Latin America as well as primary countries in Asia by providing support in a broad range of fields including water resources, energy, urban development, transportation, agricultural development, and the environment.

## Power Engineering



Nippon Koei has worked on the development of power sources and the promotion of business supporting power demand in Japan and overseas. The Company has engaged in new construction and repairs of substations, switching stations, power stations, the formation of dam management systems at hydroelectric power plants, etc.

## Urban & Spatial Development



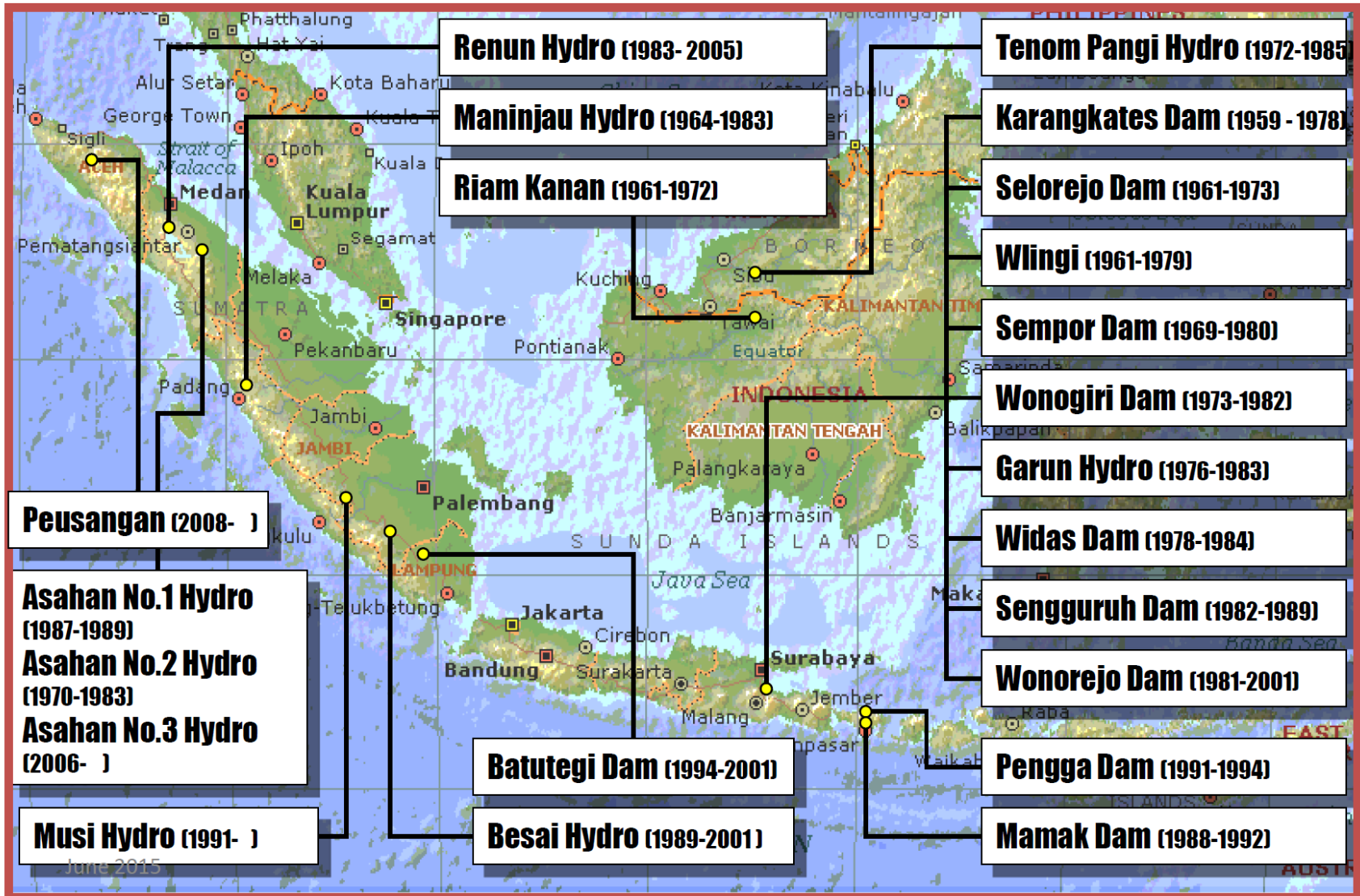
Nippon Koei strives to create a rich living space by developing urban and railway-side areas in parallel with infrastructure construction, and designing airport and railway station buildings to meet the demand for urban development mainly in emerging Asian countries.

# A Wide Range of Expertise over the World

	Japan	Asia	Middle East/ North Africa	Sub-Saharan Africa	Latin America
Energy Infrastructure	 <p><i>Kanagawa Pumped-Storage Power Station</i></p>	 <p><i>Asahan 2 Hydropower, Indonesia</i></p>	 <p><i>Masjed-Soleyman Hydropower, Iran</i></p>	 <p><i>Sundu-Minu Hydropower, Kenya</i></p>	 <p><i>Solar Power System Belize &amp; Uruguay</i></p>
Water & Sanitation	 <p><i>Landfill Project for Industrial Solid Waste</i></p>	 <p><i>Solid Waste Management Palau</i></p>	 <p><i>Doha West Sewage Treatment Plant, Qatar</i></p>	 <p><i>Rural Water Supply, Rwanda</i></p>	 <p><i>Huachipa Water System Peru</i></p>
Transportation Infrastructure	 <p><i>Onahama Port Restoration</i></p>	 <p><i>Ho Chi Minh City MRT Vietnam</i></p>	 <p><i>Tunis South Suburban Line Tunisia</i></p>	 <p><i>Greater Kampala Road Network, Uganda</i></p>	 <p><i>Callao Port Peru</i></p>
Urban Industry & Development	 <p><i>Roppongi Redevelopment</i></p>	 <p><i>Sihanoukville Port &amp; SEZ Dev. Project, Cambodia</i></p>	 <p><i>Sustainable Dev. of the Greater Cairo, Egypt</i></p>	 <p><i>Urban Development Master Plan for Lilongwe, Malawi</i></p>	 <p><i>Urban Transport Development Project, Sao Paulo, Brazil</i></p>
Environment, Disaster Management & Agriculture	 <p><i>Countermeasures against Deep-seated Landslide</i></p>	 <p><i>Forest Preservation Program, Timor-Leste</i></p>	 <p><i>Agriculture project, Jordan River Rift Valley</i></p>	 <p><i>Artisanal promotion - One Village One Product Program</i></p>	 <p><i>Agricultural Sector Strengthening, Paraguay</i></p>

## 2. Nippon Koei in Indonesia since 1959

Experienced Dam and Hydropower Project



# Clients

Our Clients include governments and governmental agencies worldwide, and international organizations such as :

## Indonesia Government



Ministry of Public Work



Ministry of Forestry



Ministry of Agriculture



PT. PLN (Persero)



Ministry of Home Affairs



PT. Mass Rapid Transit Jakarta



Ministry of Energy Mineral Resources



Ministry of Transportation



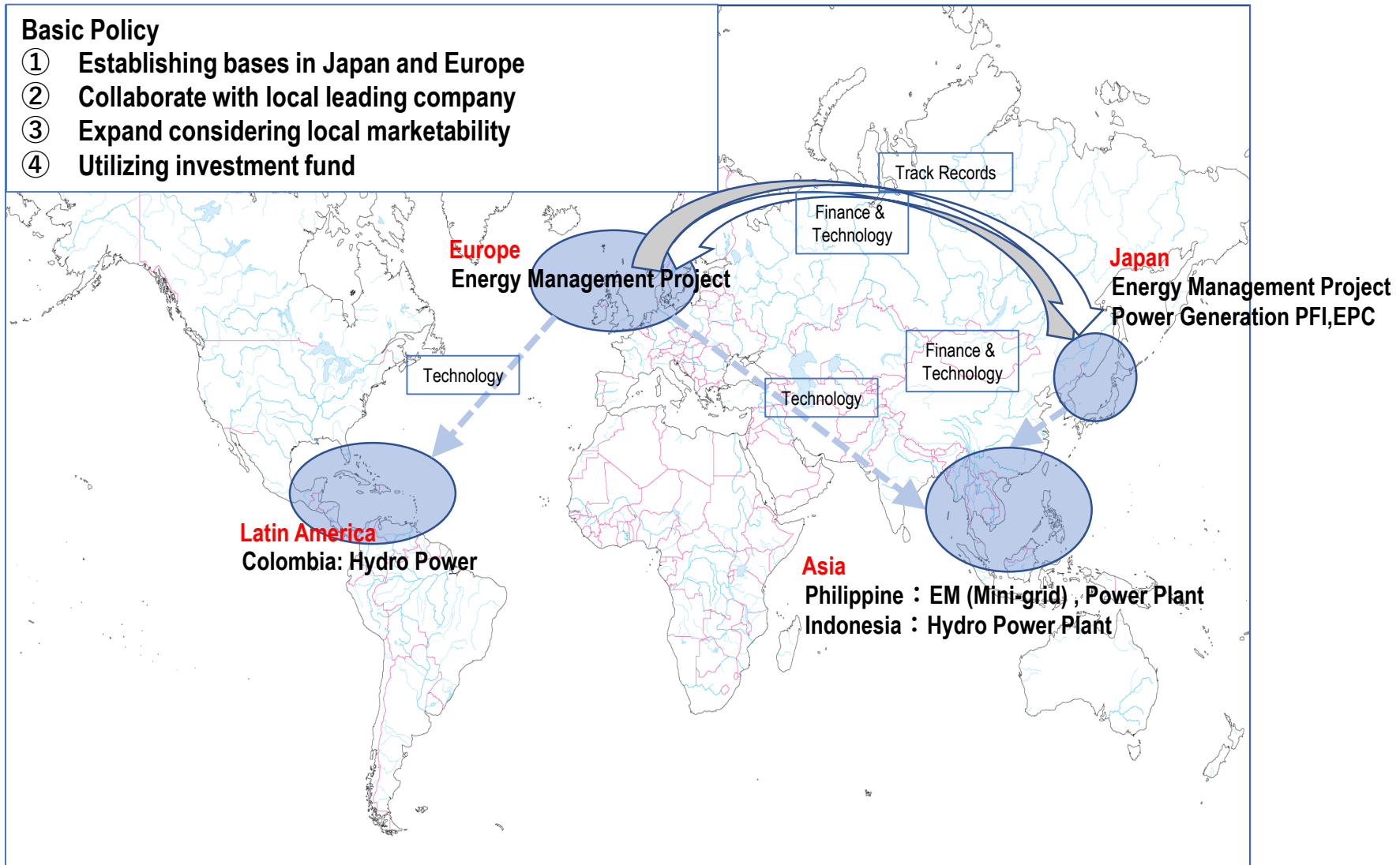
State Ministry of Environment

## Governmental Worldwide Agencies and International Organization

- Asian Development Bank (**ADB**)
- World Bank Group (**IBRD, IDA**)
- European Bank for Reconstruction and Development (**EBRD**)
- Inter-American Development Bank (**IDB**)
- United Nations (**UN**)
- Japan International Cooperation Agency (**JICA**)
- United Nations Development Programme (**UNDP**)
- Food and Agricultural Organization (**FAO**)

# 3. New Energy business of Nippon Koei

< From Consultant to Investor >



# New Energy Business of Nippon Koei

## Power Generation

- (1) Basically small hydro
- (2) EPC & Manufacturer of water wheels

## Energy Management

- (1) Ancillary service
- (2) Mini-grid business
- (3) Virtual Power Plant (VPP)



Fig. water wheels

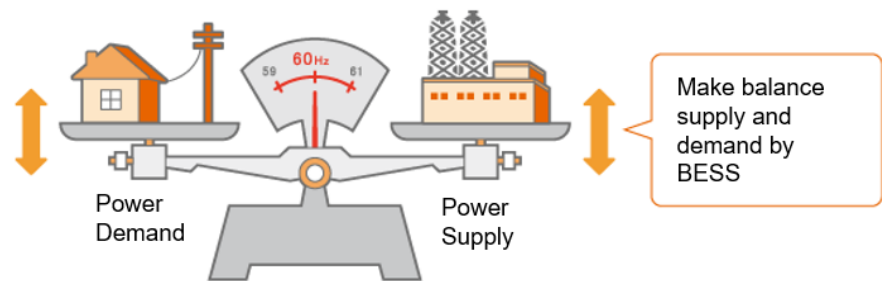


Fig. Concept of Ancillary service

# For which applications?

- **Ancillary services for grid operators**
  - Frequency regulation
  - Voltage support
  - Congestion management
  - Black start
  - Inertia
- **Renewable energy integration**
  - Load shifting
  - Load smoothing
- **Optimization of existing thermal plants**
- **Hybrid system for decentralised generation**
  - Micro grids
  - Peak shaving



## Our references abroad as an investor

- **Hydropower plants in Indonesia**
- **Biomass power plant in the Philippines**
- **Battery energy storage 4MWh & 6MWh in UK**
- **Participation as main investor to the first energy storage fund listed at the London Stock Exchange**
- **Co developer of a 25MW battery energy storage project in Belgium**

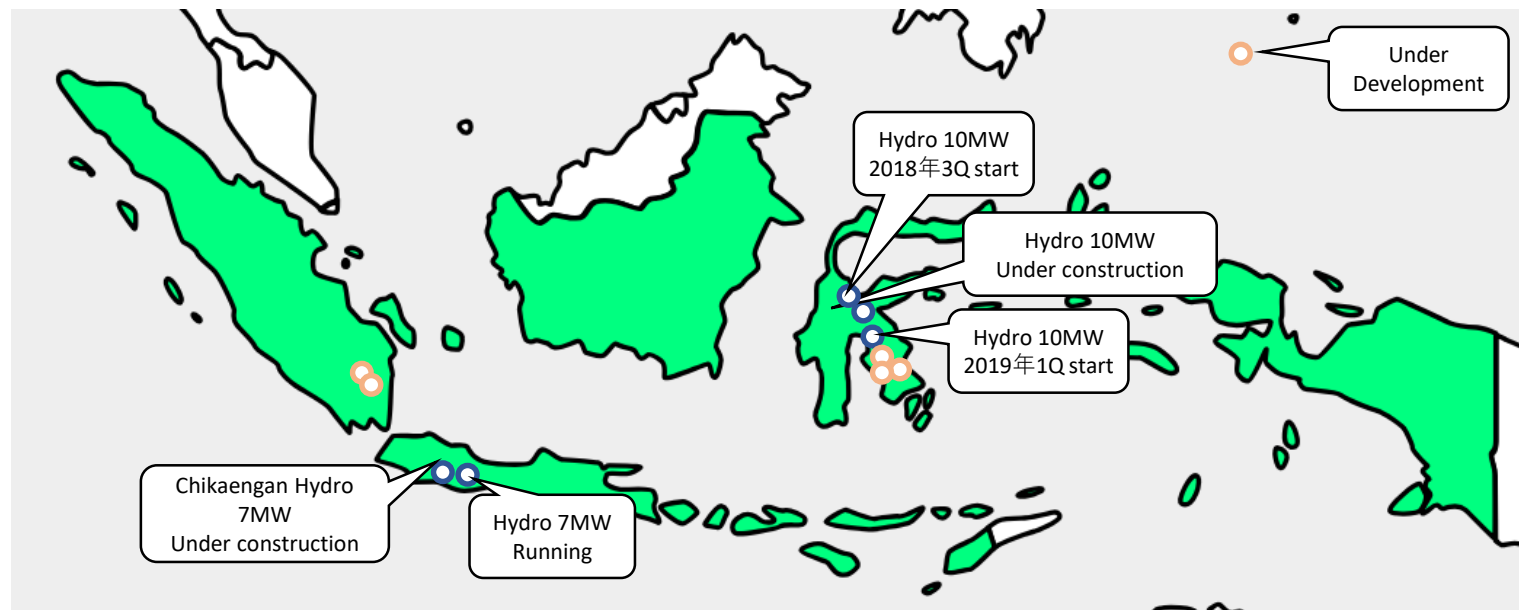
### **In Discussion:**

- **Micro grids hybrid power plants in South East Asia**
- **Portfolios of energy storage projects in UK and Continental Europe**

# 4. Possible Energy Business in Indonesia

## 4-1 Present and near future

- Focus on hydroelectric power generation business
- Complete Chikaengan power plant in 2019, and start selling power
- Get benefits from past invested Ironmomt Arkora



# Fukushima Works of NK and its Manufacturing Capabilities

“Fukushima Works” of NK is serving as a manufacturer of mechanical & electrical products.

## FUKUSHIMA WORKS

### ■ Products

Mechanical & Electrical equipment for power stations

Substations and transmission distribution systems.

Hydro power generators



### ■ Customers

9 major Power Utilities in Japan

Public or private power stations



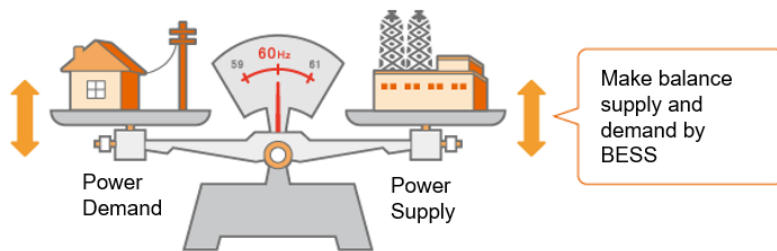
## 4-2 Future Possibilities in Indonesia

### Ancillary services

According to the growth of renewable energy sources, it becomes important to stabilize the electricity balance between supply and demand. Experiences of Nippon Koei in Europe will help Indonesia in various roles including;

- Investment
- Development
- Ownership
- Engineering
- Procurement
- Construction

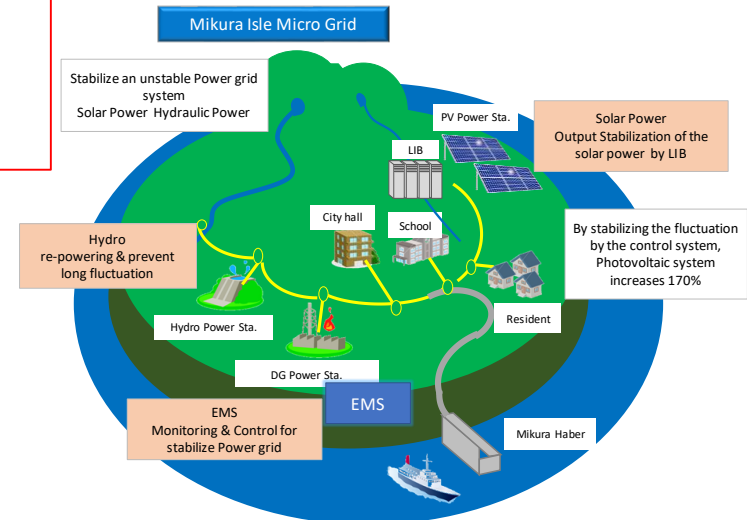
Nippon Koei will always provide Energy Management System (NK-EMS) for better performance of the services.



### Mini-grid business

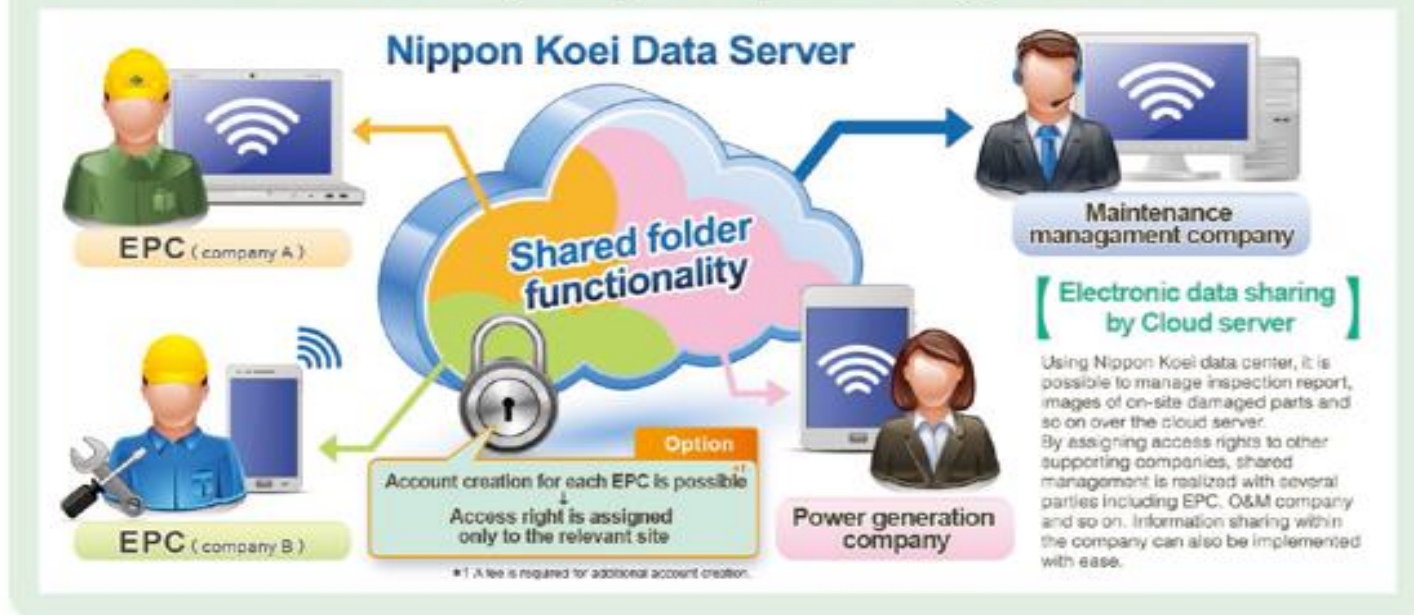
Collaborating with local mini-grid developer, Nippon Koei will invest mini-grid;

- Diesel Generators,
- Photovoltaic
- Battery Energy Storage System supporting construction and going into operation business.

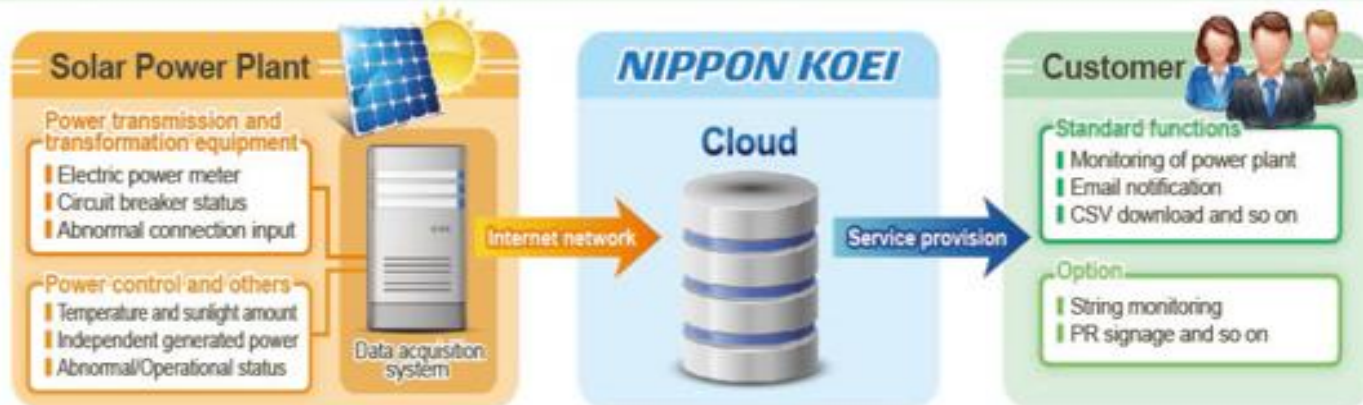


# NK-EMS (Energy Management System)

Sharing of on-site images, data and so on by multiple companies using Cloud server



## System Overview Diagram ( Standard configuration example )



# Experience of Ancillary Services in UK

- Enhanced Frequency Response with batteries (one of the first of its kind in UK)



# Vision of Mini-grid Business in the Philippines

- To conduct NK-EMS demonstration for optimal controlling DG, PV and BESS in off grid in **Island** to ensure proper control and reduce diesel oil.
- Collaborating with local mini-grid developer, NK will invest mini-grid (DG, PV and BESS), supporting construction and going into operation business.
- Utilizing know-how got from energy business and human connection in Europe for promoting new business.



## **STEP 1 : Mini-Grid**

By conducting experimental projects of Mini-Grid in small scale, experiences of operation control of Diesel Generators by NK-EMS and Hybrid IPP businesses will be achieved.

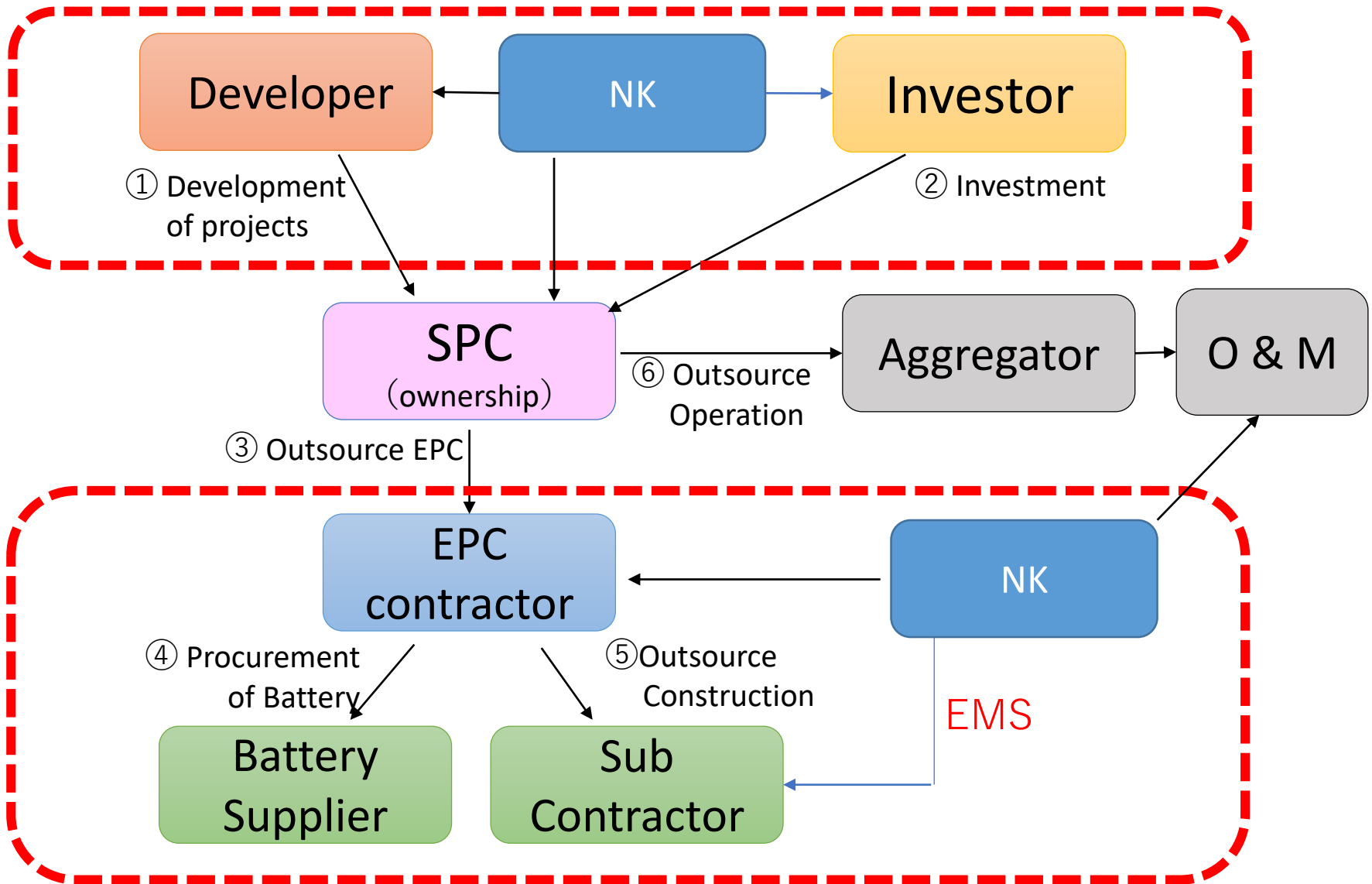
## **STEP 2 : Hybrid IPP businesses**

Based on the experimental projects of Mini-Grid, large scale hybrid generation projects will be conducted by Nippon Koei. This will give a good experience of operation for NK-EMS.

## **STEP 3 : grid operation for small island**

Based on the know-how of hybrid IPP businesses, NK will establish new business model which provides cost reduction and revenue increase for grid companies.

# 5. Call for business partners





# Thank you for your attention.

Please contact;

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***NIPPON KOEI***