Building dreams and creating spaces

Introduction of Distributed power supply system with Wind Power Generation

KOMAIHALTEC Inc.

Our Business

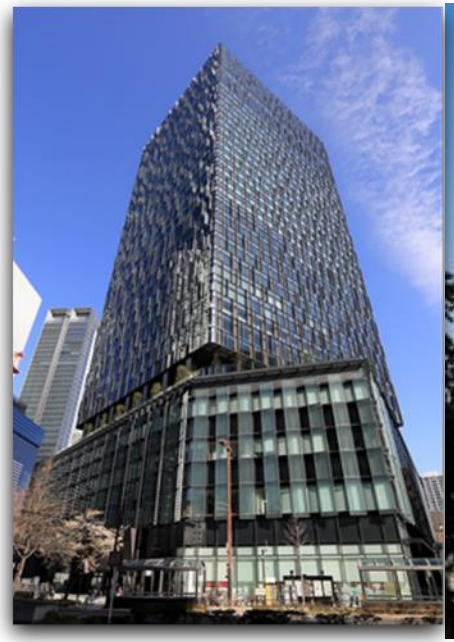
Bridge

From familiar bridges used in daily life through to long span bridges

Tokyo Bay Aqua-Line

Steel Frame

Supporting contemporary architecture and contributing to the creation of social foundations



Dai Nagoya Building

Shanghai World Financial Center

Environmental

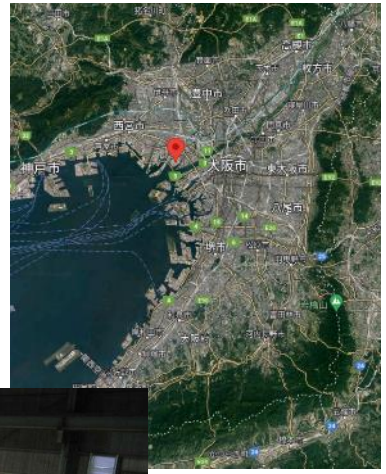
Social solutions for achieving a "sustainable society"

Fukushima Renewable Energy Institute

Production facilities
Renewable energy

Osaka Factory

- ✓ Nacelle assembly
- ✓ Blade manufacturing



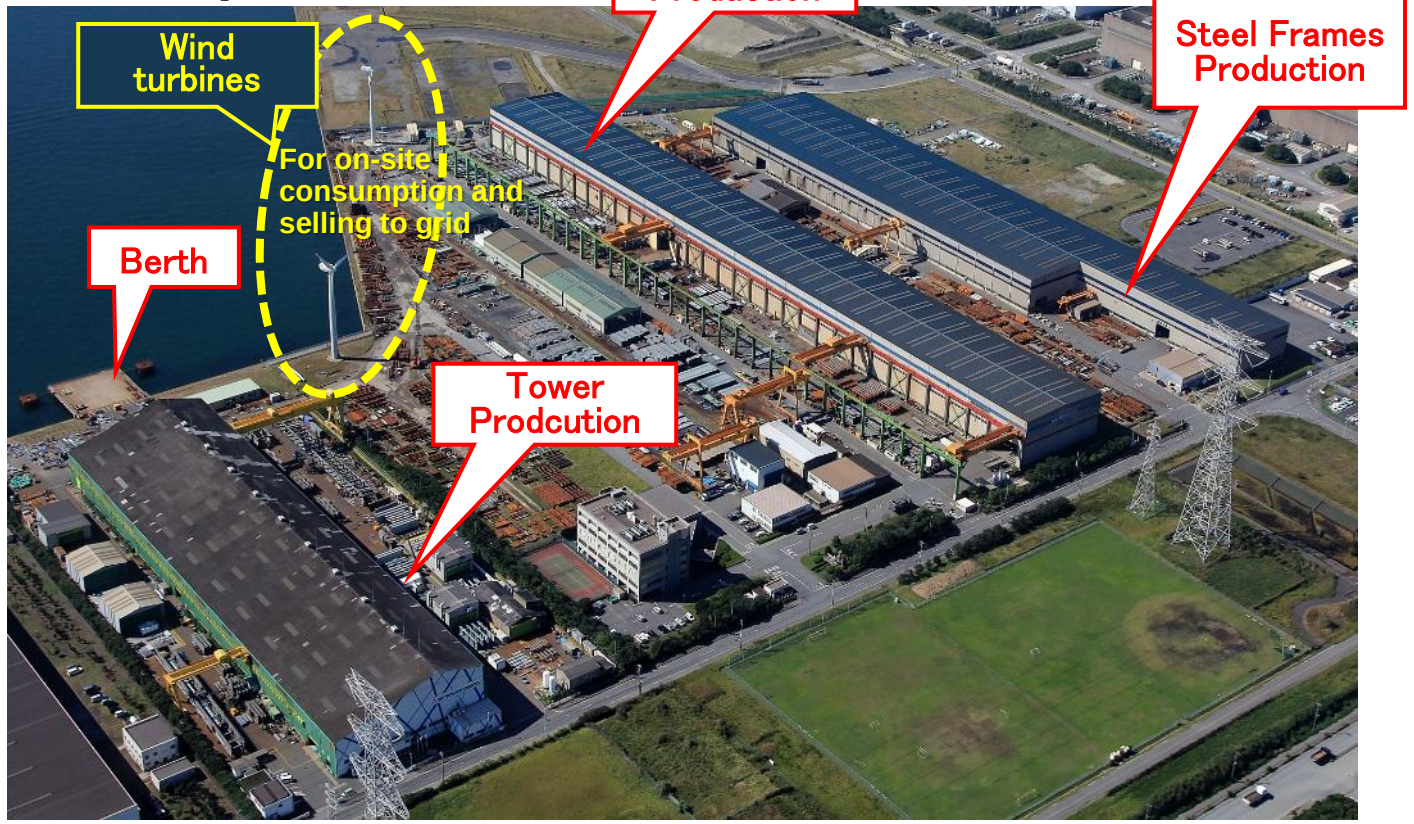
Blade production

Nacelle assembly

Location: Chiba Prefecture (~70km from Tokyo)

Approximately 15.8% (7,400,000 kWh/year) of the plant's electricity consumption is covered by wind generation. About 96% of the electricity generated by the wind turbines is consumed at the plant and the surplus occurred on holidays and nights is sold to energy companies.

Futtsu factory



Islanded Microgrid
Off-grid mode

What is **microgrid?**

Parallel with the main power grid
Off-grid or On-grid mode

A **microgrid** is a localized and self-contained energy system that can operate independently from the main power grid (off-grid mode) or as a controllable entity with respect to the main power grid (on-grid mode).

It consists of distributed energy resources (DERs), such as solar PV plant, wind turbines, storage systems such as batteries and conventional generators, all integrated and controlled by advanced software tools and communication technologies.

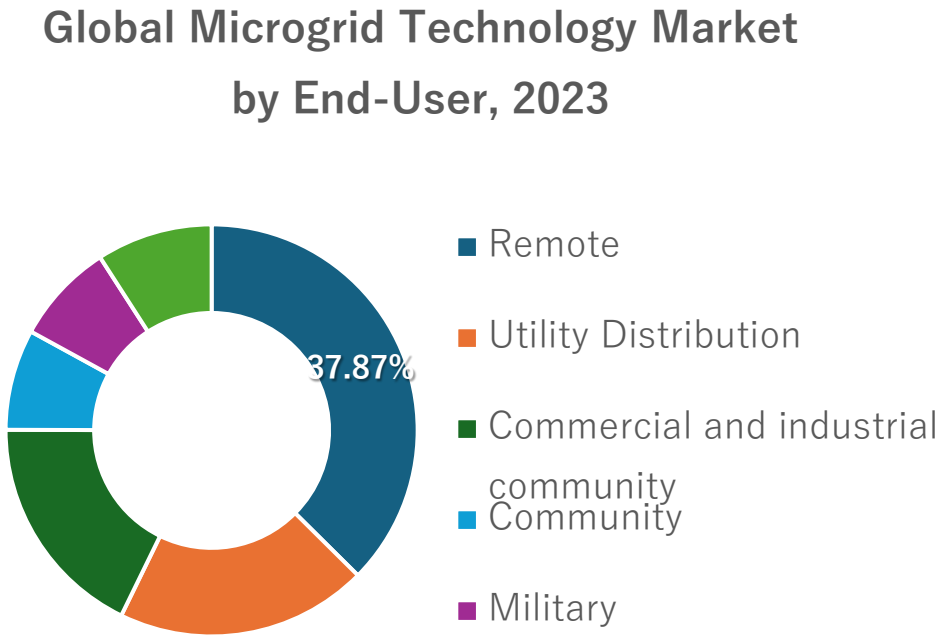
Target To improve, increase resilience and reduce carbon emissions.

Microgrid End-Users

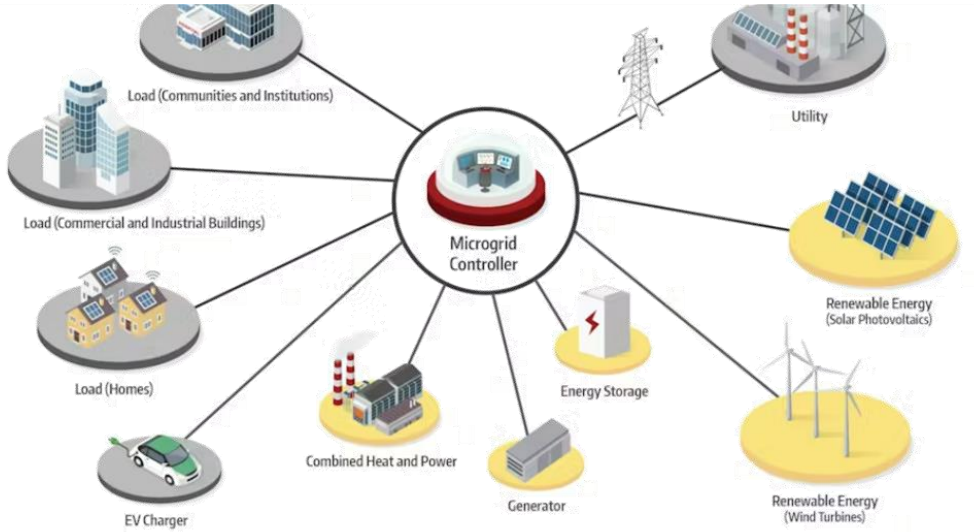
The global microgrid as a service market size was valued at USD2.87bn in 2023.

The market is projected to grow from USD3.33bn in 2024 to USD9.35bn by 2032.

Remote areas were dominating among the microgrid end-user segment due to rising deployment of the microgrid in remote areas where power management solution is needed.



Source: FORTUNE Business Insights Global Microgrid Market Report



Extreme weather conditions, aging grid structure, and risks of energy outages are driving attention and adoption of microgrids to improve energy reliability.

Current market development is compounded by extensive climate mitigation, which is one of the factors driving the market growth.

Moreover, rising investments toward a sustainable future and “net zero” strategies across private and public sectors are also boosting the demand for microgrid services.

Advantage of microgrids

Microgrids can efficiently utilize renewable energy.

- **No transmission loss**
- **Fuel Savings**
- **Digitalization and regional revitalization**
- **Effective use of waste heat from generators through cogeneration (energy efficiency)**
- **Ensuring electricity self-sufficiency in times of disaster**

In the picture: Komaihaltec wind turbine KWT300 installed for research of elemental technology for high-performance wind power generation

Customer: National Institute of Advanced Industrial Science and Technology (AIST)
Place: Fukushima City, Fukushima Prefecture, Japan

Commissioned: 2014

KWT300 Projects

DOMESTIC MARKET

Factory self-consumption

Local Power Generation

On-site consumption: universities

① Food processing factory, Shizuoka

③ Miyagawa Park, Miura city

② Steel frame and bridge factory

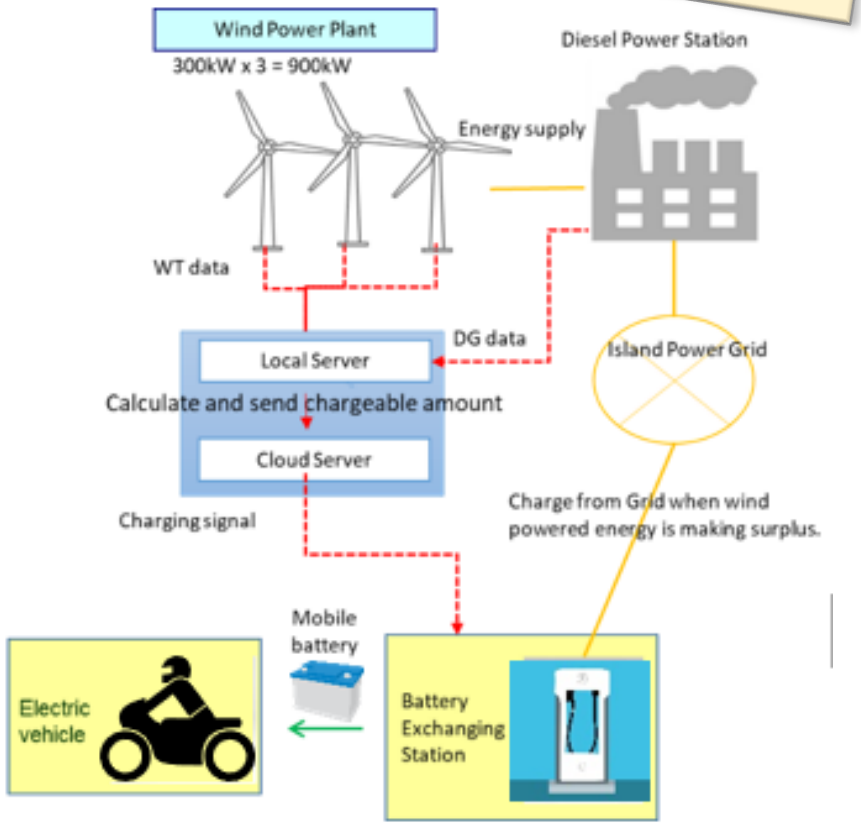
④ Fukushima City, Fukushima Prefecture

⑤ Mie University
Smart Campus Demonstration Project

⑥ Demonstration project in Niijima

Regional microgrid (Remote Islands)

Komaihaltec Experience



System for utilization of excess energy implemented in Romblon Island, Philippines

Remote islands and mountain areas are most affected by isolation in general and prolonged isolation during emergencies.

The Pacific Islands in addition to remoteness constraints are affected by typhoons and other natural disasters, and face unplanned outages not only due to emergencies but traffic accidents, damage to power lines, and most commonly storms and high winds.

For this reason, simple configurations of microgrids can be realized to improve the resiliency.

Komaihaltec KWT300 typhoon-resistant wind turbines

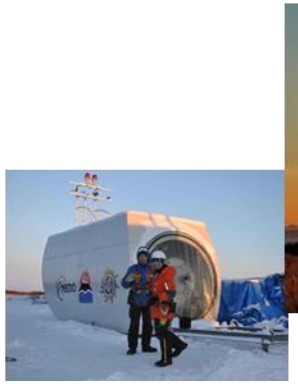
Romblon Island, Philippines

Regional microgrid (Remote Settlements)

Komaihaltec Experience

Ust-Kamchatka

- Operation start : September 2015
- Minimum operation temperature: minus 30C
- Approximate capacity factor : [25]%
- Wind turbine: 300kw x 3 units
- Diesel generator: existing
- Electrical boiler : Supplied by Fuji Electric. To absorb electricity from wind power.
- Energy Management System: Supplied by Fuji Electric



Remote islands and mountain areas are most affected by isolation in general and prolonged isolation during emergencies.

The Pacific Islands in addition to remoteness constraints are affected by typhoons and other natural disasters, and face unplanned outages not only due to emergencies but traffic accidents, damage to power lines, and most commonly storms and high winds.

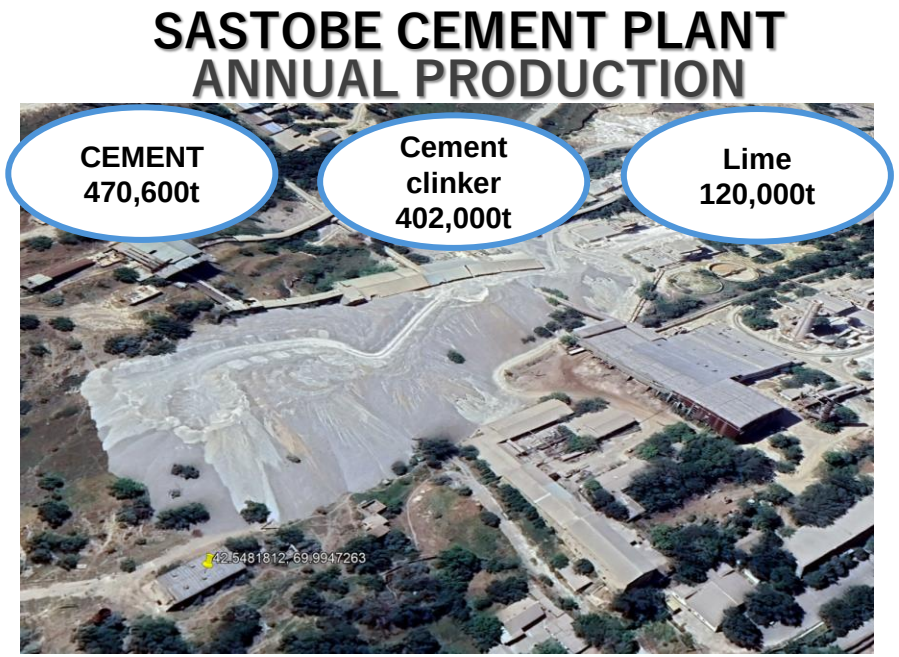
For this reason, simple configurations of microgrids can be realized to improve the resiliency.

Tiksi

- Operation start : December 2020
- Minimum operation temperature: minus 35C （minus 50C stand by)
- Approximate capacity factor : [25]%
- Wind turbine: 300kw x 3 units
- Diesel generator: 1000kw x 2 units made by Yanmar
- Battery : 300kwh made by Toshiba.
- Energy Management System: Supplied by Toko Takaoka

Regional microgrid (On-site consumption for the factory)

Joint Preliminary Feasibility Study Project



Current CO2 annual emissions
(1) Cement production: 386,322 tons
(2) Lime production: 133,440 tons

Renewable energy and power loss balance solution for factory on-site consumption

Location:	Sastobe, Turkistan region, Kazakhstan
Purpose:	Study to develop a plan for the installation of wind turbines renewable energy to displace the coal-fired plants generated energy representing 78% of current consumption mix of a cement producing company. The initiative is in line with the decarbonization Strategy for Achieving Carbon Neutrality of the Republic of Kazakhstan until 2060.
Project parties:	Komaihaltec Inc., NRI Consulting & Solutions India Turkistan region government, SAS-Tobe Technologies LLP

The renewable energy system using Japanese technology of wind power generation and solar system will demonstrate a reliable and high-efficiency technology for regional distributed energy and allow to reduce CO2 emissions.

Regional microgrid (Remote Settlements in Turkistan)

Joint Preliminary Feasibility Study Project

Site candidate
Close to Zhuzymdyk settlement

Renewable energy integration solution for power loss balance

Location:	Turkistan region, Kazakhstan
Purpose:	Study to develop a plan for the installation of wind turbines renewable energy to compensate the power grid losses, displacing thus the unsustainable coal-fired plants generated energy representing 78% of current supply mix. The initiative is in line with the decarbonization Strategy for Achieving Carbon Neutrality of the Republic of Kazakhstan until 2060.
Project parties:	Komaihaltec Inc., NRI Consulting & Solutions India Turkistan region government, KKS Group company

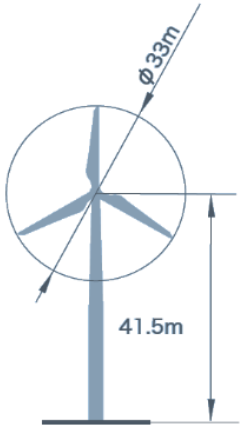
- **Good wind conditions are expected**
- **Close to KKS transmission lines**

The renewable energy system using Japanese technology of wind power generation and solar system will demonstrate a reliable and high-efficiency technology for regional distributed energy and allow to reduce CO2 emissions.

Our Products(Mediam-sized Wind Turbine)

KWT300

Rated power:	300kW
Rotor diameter:	33m
Hub height:	41.5m
Blade length:	16.0m
Nacelle weight:	18t
Cut-in speed:	3m/s
Cut-out speed:	25m/s



- ✓ **High resistance to wind turbulence**
- ✓ **Easy transportation and installation**
- ✓ **Low influence on grid**

Model	Max. wind speed Ve50
Normal climate:	70m/s
Typhoon climate:	91.26m/s (204.14mph)

TESTED & VALIDATED

KWT300 NCV is awarded with DNV GL certificate.

KWT300 TCV is undergoing UL/DEWI-OCC's design certification and CLASS NK type certification.

KWT1.0 to be validated and tested by UL/DEWI-OCC and undergo CLASS NK type certification.

ONE-PIECE BLADE

Glued-free one piece blade technology eliminates weaker areas at glued joints.

INTEGRATED BATTERY

Output stabilization is reached by storage batteries integrated in wind turbine, which is effective against wind turbine fluctuations.

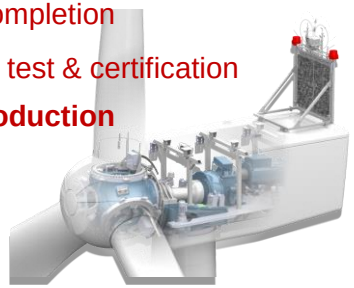
MICROGRID-FRIENDLY

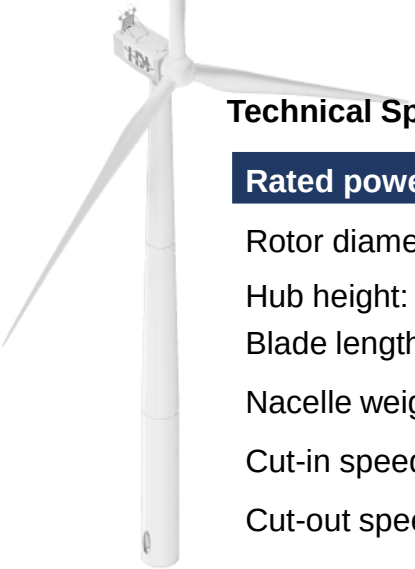
Proven track record in different climatic conditions.

KWT1.0

1MW CLASS SOLUTION

2024	Design completion
2025-2026	Prototype test & certification
2027	**Serial production**





Technical Specification

Rated power:	1MW
Rotor diameter:	67m
Hub height:	60m
Blade length:	32.5m
Nacelle weight:	35t
Cut-in speed:	3m/s
Cut-out speed:	25m/s

Our Products (Sky Solar Systems)

High Pole Sky Solar

Solar panels are mounted on evenly spaced high poles with beams passing through them.

- Installation interval between high poles can be up to 9 x 9m.
- Designed and installed with a pole height suitable for specific land use needs (standard range 3～7m).
- The most optimal tilt angle is selected for individual location.

Solar power solutions that utilize the space above the ground not affecting topography and land use.

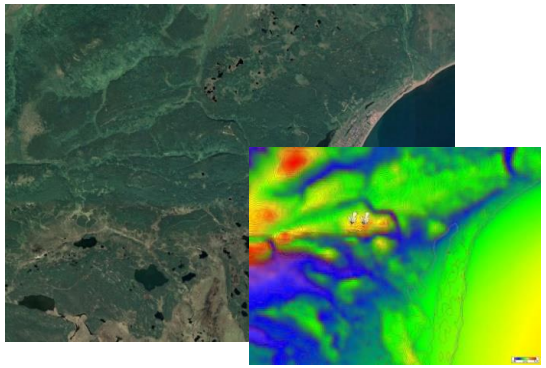
Cable-Suspension Sky Solar

(Patented)

- The solution of PV panels suspension is built based on our experience and expertise in suspension bridge technology.
- This solution allows utilization of space above lakes, rivers, and many others.
- Customizable to fit the land-specific conditions.

The cable system with a span of up to 50m can be installed in complex terrains, such as over the water, increasing the flexibility of land use under the panels.

Basic Project Development Process



Selection of site

Wind measurement, system configuration

Initial Development

- Site selection
- Wind measurement* and power generation simulation

*banks (lenders) may require data for one year

- System configuration development

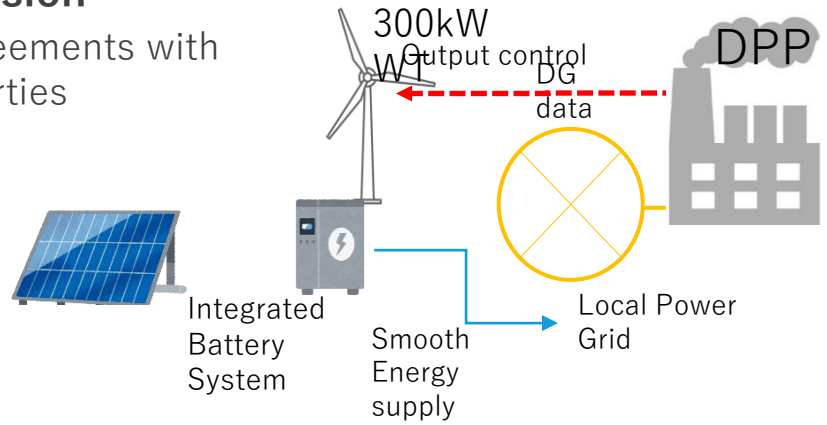
Financial model assessment

Project finance

Agreement conclusion

Agreement conclusion

- Conclusion of agreements with project counterparties



Implementation stage

Design, supply, construction, commissioning

Power generation

Maintenance of facilities

KOMAIHALTEC Inc.

Contact us

We’re here to support you along the way

enew@komaihaltec.co.jp

https://www.komaihaltec.co.jp/env/english/