



**ESS 4.0**  
**ENERGY SAFETY COMPANY**  
**BA ENERGY CO., LTD.**

Not being prepared  
means not being safe.

## BA is always ready

Based on BA ENERGY CO., LTD. material and thermal energy management ICT technology, we are launching a variety of energy safety management solutions to the market.

Through this, we want to contribute to the safety of the energy industry and become a global energy company representing Korea.



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Beyond materials Associates

|              |  |
|--------------|--|
| Company name | BA ENERGY CO., LTD.  |
| CEO          | Kang Taeyeong  |
| Head office  | B-Dong, 12, Cheomdanyeonsin-ro, Buk-gu, Gwangju, Republic of Korea                           |
| Factory      | 19-17, Donghampyeongsandan-gil, Hakgyo-myeon, Hampyeong-gun, Jeollanam-do, Republic of Korea |
| India office | 8F KSC, Building 8-C DLF Cyber City, Phase-2 Gurgaon Haryana-122002                          |

[BA Energy whole view of Hampyeong factory]



# BA ENERGY HISTORY



## 2017

- 2017. 05 Korea Electric Power Corporation (KEPCO) Selected as a New Energy Industry Promotion Company
- 2017. 11 Management Innovation Small and Medium Business (MAIN-BIZ) Certification
- 2017. 11 Prime Minister's Commendation Award for Young Entrepreneurs
- 2017. 11 Jeonnam Techno Park Selected as a Promising Export Company

## 2018

- 2018. 03 Global IP Star Company Selection
- 2018. 04 Energy Valley Enterprise Investment and Transfer Agreement for Public Institutions
- 2018. 07 Korea Exchange KSM Registration
- 2018. 12 Gwangju Metropolitan City Mayor's Commendation
- 2018. 12 Selected as Jeollanam-do Small and Medium Business Awards

## 2019

- 2019. 02 Hyundai Electric and Energy System Signed MOU
- 2019. 04 OCI Power Signed MOU
- 2019. 06 Korea Electric Power Corporation (KEPCO) Energy Valley Star Company Selection
- 2019. 10 Establishment of India Office
- 2019. 10 President of Korea Electric Power Corporation (KEPCO) Commendation
- 2019. 11 BIXPO Startup Investment Competition Gold Prize

## 2020

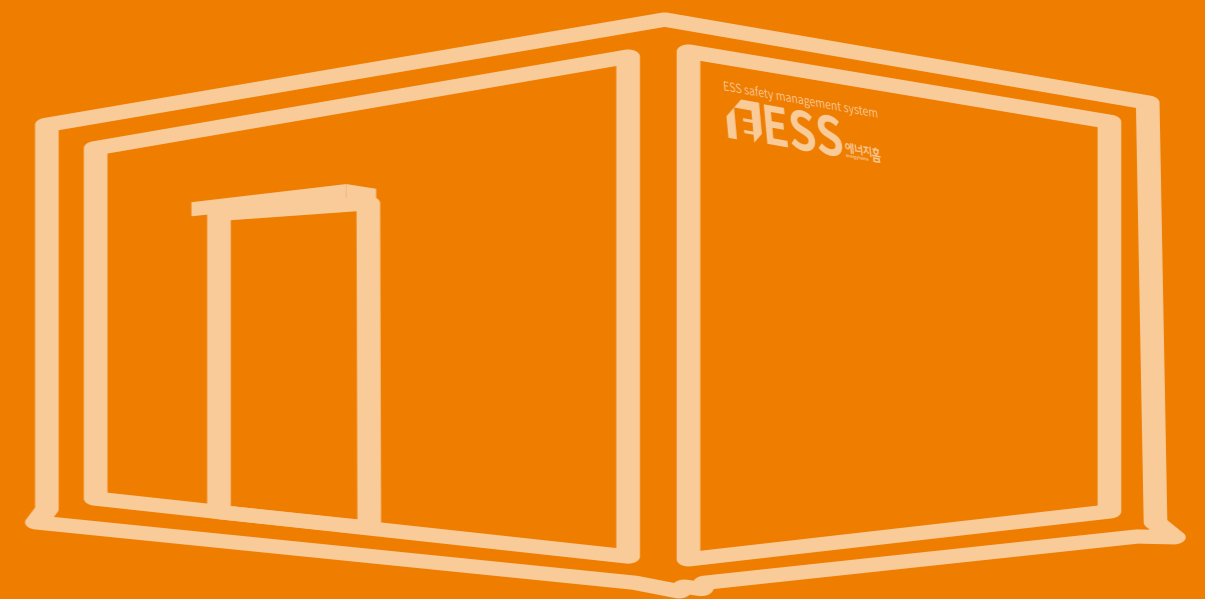
- 2020. 02 Materials, Parts Special Company Certification
- 2020. 05 Selection of Companies for Work-life Balance Campaign
- 2020. 05 Gwangju Regional Star Company Selection
- 2020. 06 Selection of Technology Competent Companies
- 2020. 06 Minister of Trade, Industry and Energy Commendation
- 2020. 10 Secondary Battery Industry Specialist Training Project Signed MOU
- 2020. 10 Korea Small and Medium Business Corporation Next Unicorn Selection Signed MOU
- 2020. 12 Minister of SMEs and Startups Commendation

CONTRIBUTION TO THE NEXT GENERATION  
THROUGH ENERGY SAFETY TECHNOLOGY

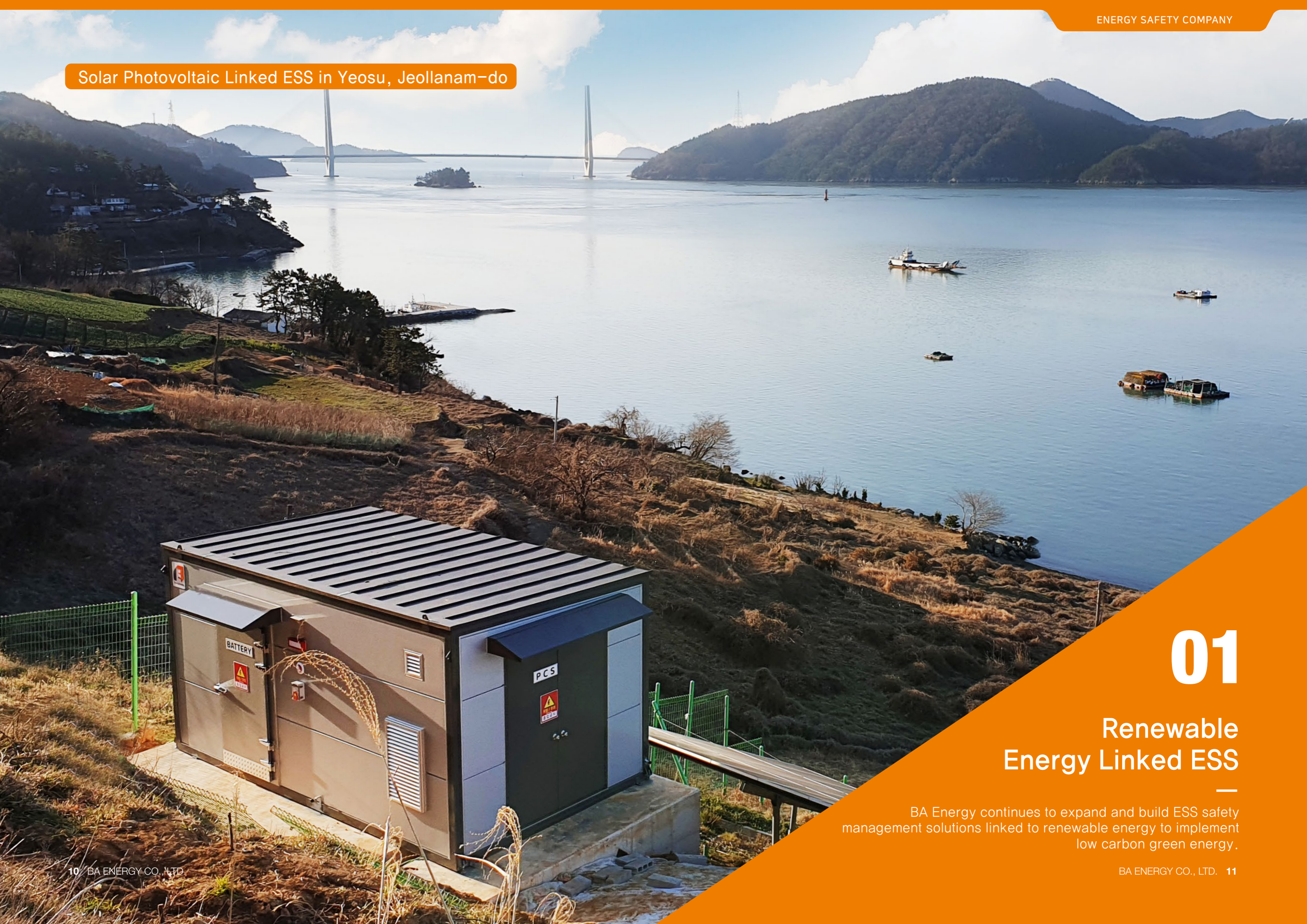
# ESS

## Safety Management Solution

- 01 Renewable Energy Linked ESS
- 02 ESS for Peak-CUT
- 03 Electric Vehicle Charging Station Linked ESS
- 04 Microgrid ESS
- 05 Overseas Delivery Cases



Solar Photovoltaic Linked ESS in Yeosu, Jeollanam-do



# 01

## Renewable Energy Linked ESS

BA Energy continues to expand and build ESS safety management solutions linked to renewable energy to implement low carbon green energy.

# 01

Jeungpyeong-si,  
Chungcheongbuk-do  
PV-ESS



# 03

Gunwi-gun,  
Gyeongsangbuk-do  
PV-ESS



# 02

Hwaseong-si,  
Gyeonggi-do  
PV-ESS



# 04

Jangsu-gun,  
Jeollabuk-do  
PV-ESS



ESS for Reducing Peak at Ochang Factory of Green Cross in Cheongju, Chungcheongbuk-do



# 02

## ESS for Peak-CUT

BA Energy has installed and operated ESS for peak reduction and is recognized for its technical skills as an ESS safety management solution provider. Recently, We successfully delivered to Public Museum to Gongju-si, Buyeo-si, Chuncheon-si and Dabu-do(Island) Marine Safety Experience Center, etc.



# 01

Jeollabuk-do  
Namwon City Hall  
ESS for Peak-CUT



# 03

Gwangju  
Chosun University  
ESS for Peak-CUT



# 02

Chungcheongnam-do  
National Museum  
ESS for Peak-CUT



# 04

Jeollabuk-do  
Korea National Land  
Information Corporation  
ESS for Peak-CUT





# 03

## Electric Vehicle Charging Station Linked ESS

BA Energy is focused on Energy-Mobility convergence station business. Applicable fields include Waste battery EV Charging, ESS EV Charging, Public service EV Charging, and Smart EV Charging.

## Pungdo Island Project in Ansan, Gyeonggi-do



## 04

## Microgrid ESS

BA Energy develops and supplies ON/OFF Microgrid ESS for regions and countries where energy supply is difficult. Recently, we delivered Microgrid ESS to Pungdo Island in Ansan City to help build a new and renewable energy self-reliance island.

Thai Rayong Petrochemical Company PTTGC



# 05

## Overseas Delivery Cases

BA Energy recently worked with Hyundai Electric on an industrial ESS overseas project in Thailand. Thailand's first industrial ESS was manufactured as a 40FT high-cube container type and delivered successfully. In addition, Microgrid ESS has been successfully delivered to East Timor, and ESS projects are being carried out with various countries such as India, Spain, Indonesia, Morocco, and Vietnam.



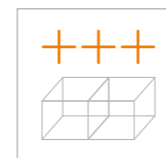
# ESS Technology

## Hardware

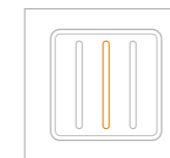
For the safe management of ESS batteries, it is an optimal safety management solution with fire fighting, air conditioning, and EMS based on advanced materials and ICT technologies.



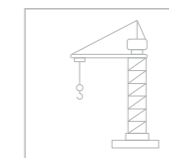
Developed as an optimized space management solution for secure management of ESS. The thermal energy management technology patented by BA Energy has been integrated into the safety improvement of ESS.



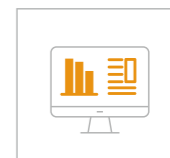
**Module Scalability**  
Customizable size can be created



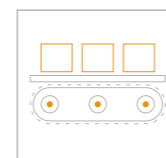
**Insulation System**  
Double skin triple insulation



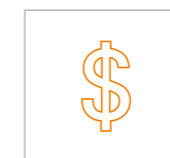
**Structural Design Frame**  
Designing safety structures



**SMS**  
Integrated safety control system



**Factory Mass Production Model**  
Uniform quality module design



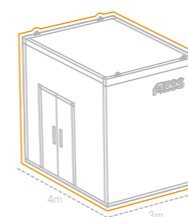
**Excellent Economic Efficiency**  
Production and cooperation reduce costs



**Internal Non-Smoke System**  
Fire spread prevention

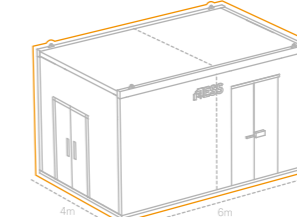


**Advanced Air Conditioning and Firefighting Systems**  
Safety air conditioning system



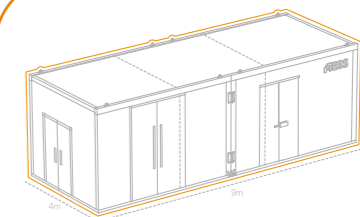
**1Module / 100kW**

**Standard :** 4M(W)×3M(L)×3M(H)  
**Insulation :** Urethane 75T, Energy lab 6T, Glass wool 100T  
**Air conditioning :** Air conditioning 2HP 1EA (Wall mounted type)  
**Firefighting :** Solid aerosols, Reception boards, Heat/Smoke detectors, Powder-type fire extinguishers  
**Door :** 1EA each of the Heatproof Doors and Fireproof Doors



**2Module / 500kW**

**Standard :** 4M(W)×6M(L)×3M(H)  
**Insulation :** Urethane 75T, Energy lab 6T, Glass wool 100T  
**Air conditioning :** Air conditioning 2.5HP 2EA  
**Firefighting :** Solid aerosols, Reception boards, Heat/Smoke detectors, Powder-type fire extinguishers  
**Door :** 1EA each of the Heatproof Doors and Fireproof Doors



**3Module / 1MW**

**Standard :** 4M(W)×9M(L)×3M(H)  
**Insulation :** Urethane 75T, Energy lab 6T, Glass wool 100T  
**Air conditioning :** Air conditioning 5HP 2EA  
**Firefighting :** Solid aerosols, Reception boards, Heat/Smoke detectors, Powder-type fire extinguishers  
**Door :** 1EA each of the Heatproof Doors and Fireproof Doors



Safety management systems may be able to identify the safety status and trends of ESS. And safety management monitoring and control can also reduce employer risk.



Safety Management Monitoring



Custom Sensor Design



Data Management



Big Data



Real-Time Report



Step-by-Step Alert



Risk Management

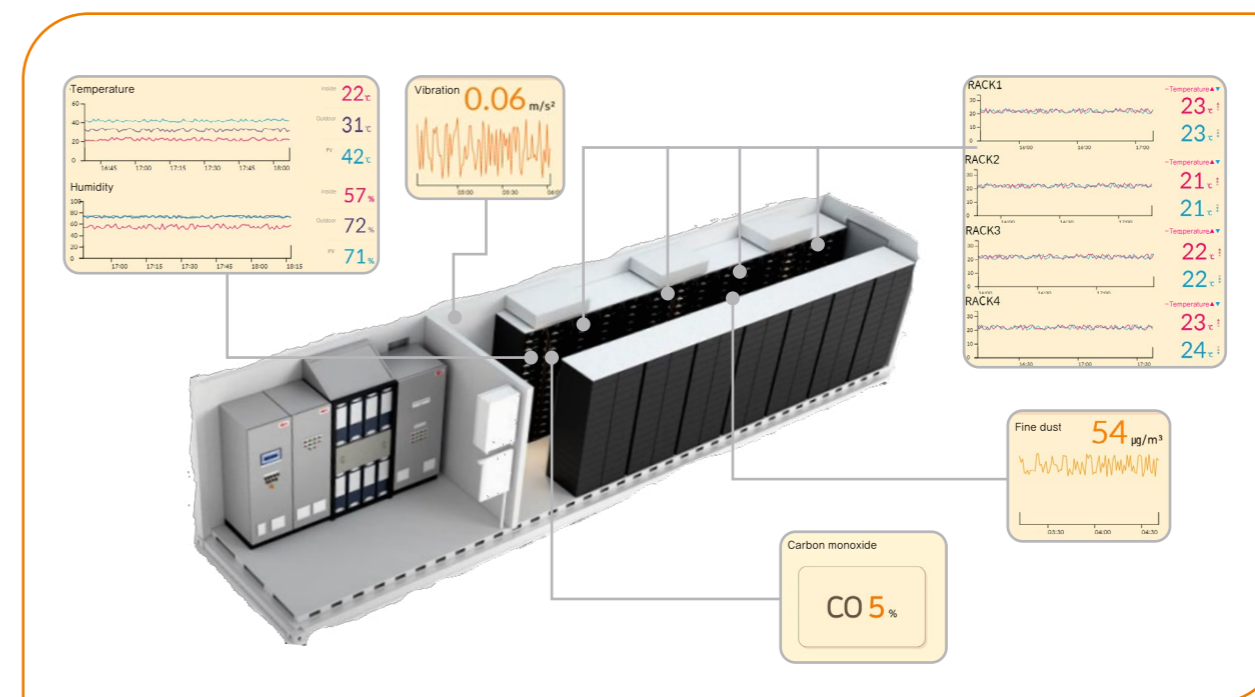


HMI/APP

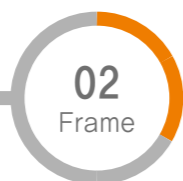
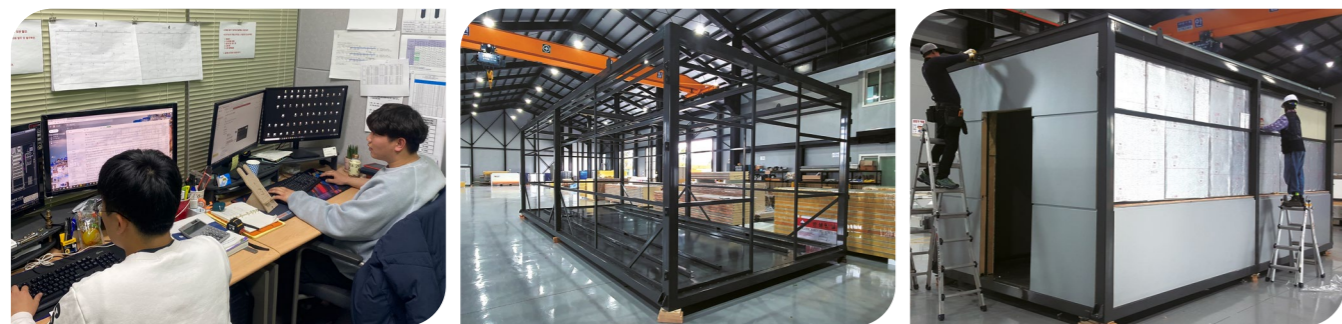
# ESS Technology

## Software

SMS (Safety Management Solution) is an integrated safety management solution designed to optimize personal and industrial safety management by installing it in Renewable energy power plants, Secondary batteries, and Electric vehicle charging stations.



# Manufacturing Process



# Product Line-up



[Modular type]



[Containerized type]  
(For Export)



[GRP type]  
(Glass Reinforced Fiber Plastic)

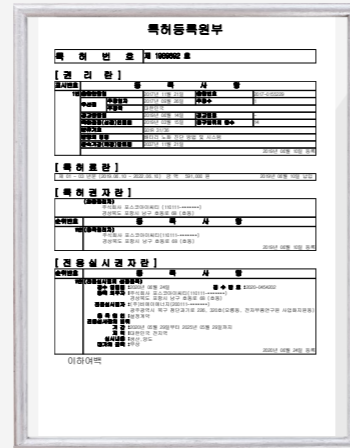


[Microgrid type]  
(GRP type)

Patent



Microcapsules with Phase Change Substances and Complexes of Silica, The Method of Manufacturing It and the Composition of the Non-Combustible Binder Including It



Battery Aging Diagnostic Methods and Systems



Fire Extinguishing Equipment



Heat Exchanger for Air-Conditioning Using PCM

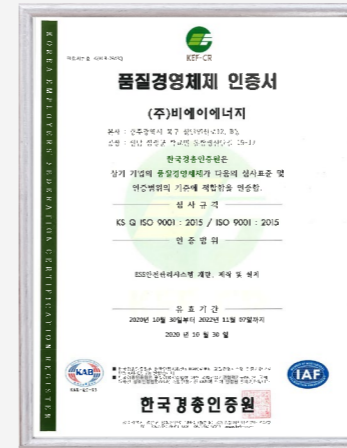


Exterior Wall Structure of An Electronic Equipment Receptive System with Simultaneous Heat Shield, Insulation, and Heat Dissipation

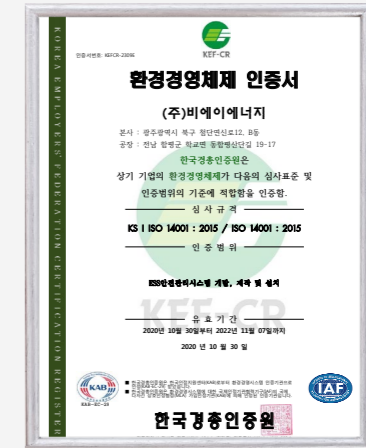


Multiple Thermal Discoloration Beads, Their Manufacturing Methods and Applications

Certificate



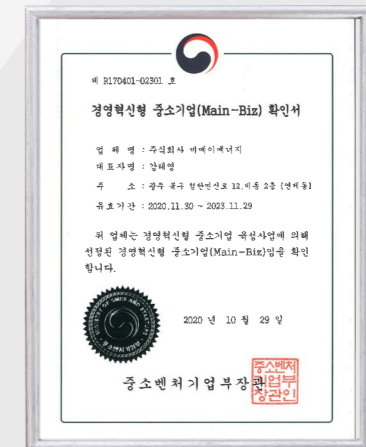
ISO 9001



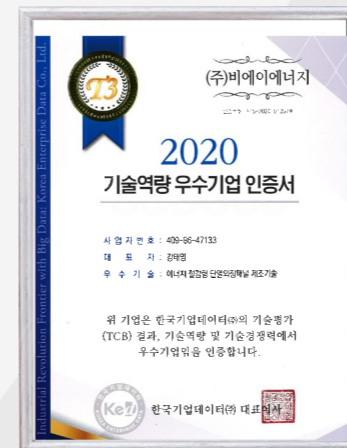
ISO 14001



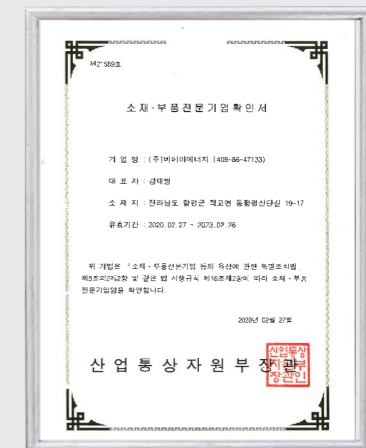
ISO 45001



Management Innovation Small and Medium Business (MAIN-BIZ) Confirmation Letter



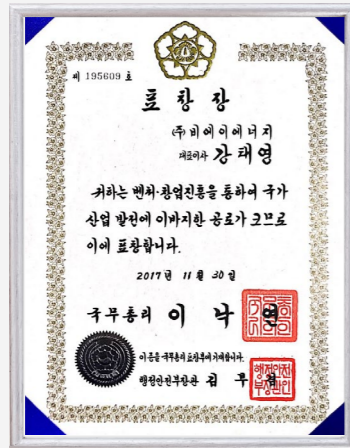
Certificate of Excellent Technology Competency



Confirmation Letter for Material Parts Company



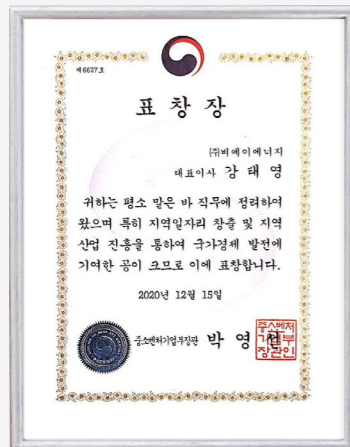
Award



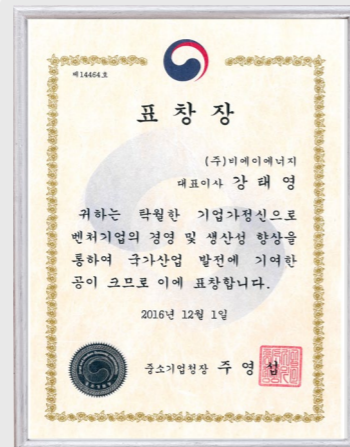
Prime Minister's Commendation



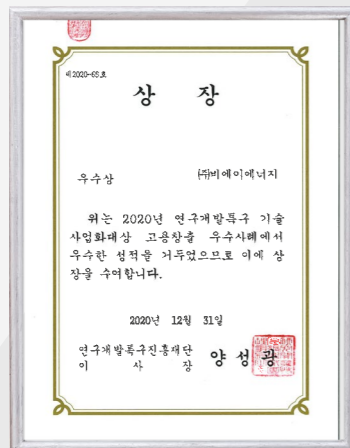
Minister of Trade, Industry and Energy Award Commendation



Minister of SMEs and Startups Award Commendation



Small and Medium Business Administration Award Commendation

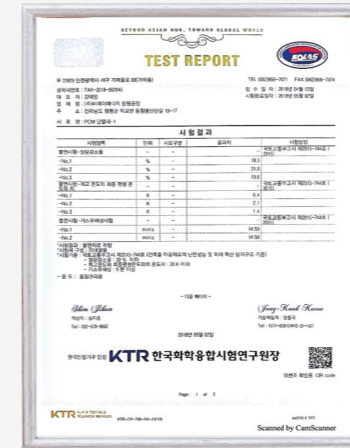


Excellence in Technology Commercialization Award

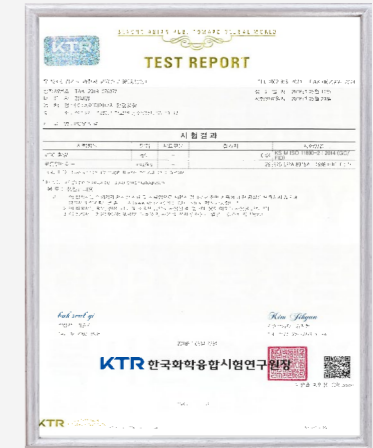


Gwangju Metropolitan City Mayor Award Commendation

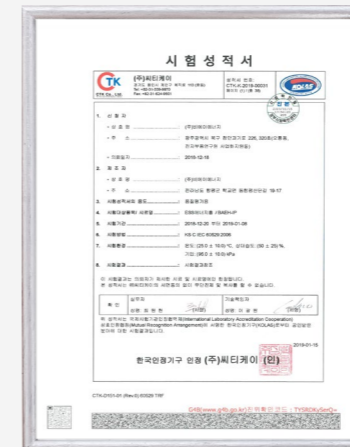
Test Report



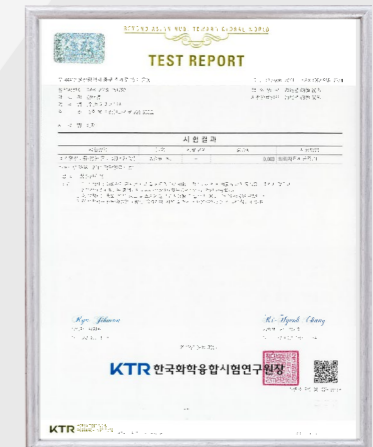
PCM Insulation Test Report



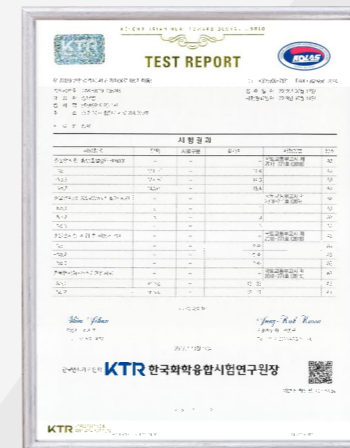
PCM Paint (VOC Content, Formaldehyde) Test Report



ESS Energy Home IP55 Test Report



A Non-Combustion Test Report



A non-Combustion Test Report



Microhome Energy Operations Solution 1.02 Test Report



BA Energy  
Domestic Partners



BA Energy  
Public Institutions and  
Overseas Partners

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# Major Delivery Performance

## Public Institutions Delivery Performance

| Installation Year | Installation Area  | Power Generation Capacity (MW) | ESS Capacity (MWh) |
|-------------------|--|--------------------------------|--------------------|
| 2020              | Gongju Museum in Gongju-si, Chungcheongnam-do                    | 0.1                            | 0.3                |
|                   | Nanji Creative Studio in Seoul Metropolitan City                 | 0.1                            | 0.3                |
|                   | Student Education and Culture Center in Ulsan Metropolitan City  | 0.1                            | 0.3                |
|                   | Daebudo Marine Safety Experience Center in Ansan-si, Gyeonggi-do | 0.1                            | 0.3                |
|                   | Buyeo National Museum in Buyeo-si, Chungcheongnam-do             | 0.1                            | 0.3                |
|                   | Chuncheon National Hospital in Chuncheon-si, Gangwon-do          | 0.1                            | 0.3                |
| 2019              | Chosun University in Gwangju Metropolitan City                   | 0.5                            | 1.5                |
|                   | Self-reliance Island Project in Ansan-si, Gyeonggi-do            | 0.175                          | 0.013              |
|                   | Namwon City Hall in Namwon-si, Jeollabuk-do                      | 0.1                            | 0.3                |
|                   | Etri in Daejeon Metropolitan City                                | 0.5                            | 1.4                |
|                   | National Land Information Corporation in Jeonju-si, Jeollabuk-do | 0.1                            | 0.3                |
|                   | Metropolitan Resource Center in Busan Metropolitan City          | 0.25                           | 0.8                |
| 2018              | National Arboretum in Sejong City                                | 0.25                           | 0.8                |
|                   | Bonggae-dong Garbage Shelter in Jeju City                        | 1.2                            | 3.7                |
|                   | Bonggae-dong Garbage Shelter in Jeju City                        | 0.4                            | 1.5                |
|                   | Chosun University in Gwangju Metropolitan City                   | 0.2                            | 0.6                |
| <b>Total</b>      |  | <b>4.275</b>                   | <b>12.713</b>      |

## Private Enterprise Delivery Performance

| Installation Year           | Installation Area   | Power Generation Capacity (MW) | ESS Capacity (MWh) |
|-----------------------------|---|--------------------------------|--------------------|
| 2020                        | Hongseong-gun, Chungcheongnam-do PV                             | 0.5                            | 1.5                |
|                             | Namwon-si, Jeollanam-do PV                                      | 0.3                            | 1                  |
|                             | Namwon-si, Jeollanam-do PV                                      | 0.3                            | 1                  |
|                             | Hwasun-gun, Jeollanam-do PV                                     | 0.099                          | 0                  |
|                             | Sancheong-gun, Gyeongsangnam-do PV                              | 1                              | 3                  |
|                             | Sancheong-gun, Gyeongsangnam-do PV                              | 1                              | 3                  |
|                             | Shinan-gun, Jeollanam-do PV                                     | 1                              | 3                  |
|                             | Yeosu-si, Jeollanam-do PV                                       | 0.3                            | 1                  |
|                             | Jeju-do   | -                              | 0.13               |
|                             | Jeju-do   | -                              | 0.13               |
|                             | Hampyeong-gun, Jeollanam-do PV                                  | 1                              | 3                  |
|                             | Hampyeong-gun, Jeollanam-do PV                                  | 1                              | 3                  |
|                             | Cheongju-si, Chungcheongbuk-do Factory (GES)                    | 0.1                            | 0.2                |
|                             | Naju-si, Jeollanam-do Factory                                   | 0.3                            | 0.753              |
|                             | Jeju-do   | -                              | 0.3                |
|                             | Gangjin-gun, Jeollanam-do PV                                    | 1                              | 3                  |
|                             | Gangjin-gun, Jeollanam-do PV                                    | 1                              | 3                  |
|                             | Gangjin-gun, Jeollanam-do PV                                    | 1                              | 3                  |
|                             | Eumseong-gun, Chungcheongbuk-do PV                              | 0.5                            | 1.5                |
|                             | Gunwi-gun, Gyeongsangbuk-do PV                                  | 0.4                            | 1.2                |
| Yeosu-si, Jeollanam-do PV   | 0.3   | 1                              |                    |
| 2019                        | Ochang Sandan, Chungcheongbuk-do Green Cross Factory            | 1                              | 3                  |
|                             | Ochang Sandan, Chungcheongbuk-do Green Cross Factory            | 1                              | 3                  |
|                             | Jangseong-gun, Jeollanam-do Factory                             | 0.03                           | 0.091              |
|                             | Yeongam-gun, Jeollanam-do PV                                    | 0.5                            | 1.4                |
|                             | Yeongam-gun, Jeollanam-do PV                                    | 0.5                            | 1.4                |
|                             | Gongju, Chungcheongnam-do For Demonstration of Waste Batteries  | 0.1                            | 0.3                |
|                             | Hwaseong-si, Gyeonggi-do PV                                     | 0.5                            | 1.5                |
|                             | Muan-gun, Jeollanam-do PV                                       | 0.1                            | 0.274              |
|                             | Jingok Industrial Complex, Gwangju PV                           | 0                              | 0.05               |
|                             | Jinan-gun, Jeollabuk-do PV                                      | 0.5                            | 1.5                |
| 2018                        | Jangsu-gun, Jeollabuk-do PV                                     | 1                              | 3                  |
|                             | Sangju-si, Gyeongsangbuk-do PV                                  | 0.4                            | 1.096              |
|                             | Gwangsan-gu, Gwangju PV   | 0.6                            | 1.8                |
|                             | Changwon-si, Gyeongsangnam-do PV                                | 0.1                            | 0.274              |
|                             | Jeongeup-si, Jeollabuk-do PV                                    | 0.5                            | 1.5                |
|                             | Cheongyang-gun, Chungcheongnam-do Cheongyang Industrial Complex | 0.25                           | 0.548              |
|                             | Jangsu-gun, Jeollabuk-do PV                                     | 0.5                            | 1.5                |
|                             | Jangsu-gun, Jeollabuk-do PV                                     | 0.5                            | 1.5                |
|                             | Jangsu-gun, Jeollabuk-do PV                                     | 0.5                            | 1.5                |
|                             | Cheongju-si, Chungcheongbuk-do PV                               | 0.08                           | 0.04               |
| 2018                        | Hapcheon-si, Gyeongsangnam-do PV                                | 0.1                            | 0.3                |
|                             | Hapcheon-si, Gyeongsangnam-do PV                                | 0.3                            | 0.9                |
|                             | Suncheon-si, Jeollanam-do PV                                    | 0.07                           | 0.21               |
|                             | Buyeo-gun, Chungcheongnam-do PV                                 | 0.1                            | 0.274              |
|                             | Ilsan KINTEX Exhibition   | 0.1                            | 0.274              |
|                             | Gunsan-si, Jeollabuk-do Factory                                 | 2                              | -                  |
|                             | Jeju-si PV  | 0.1                            | 0.274              |
|                             | Wando-gun, Jeollanam-do PV                                      | 0.36                           | 1.6                |
|                             | Wando-gun, Jeollanam-do PV                                      | 1.6                            | 5.2                |
|                             | Haenam-gun, Jeollanam-do PV                                     | 1                              | 3                  |
| Haenam-gun, Jeollanam-do PV | 1   | 3                              |                    |
| 2018                        | Nonsan-si, Chungcheongnam-do PV                                 | 0.1                            | 0.206              |
|                             | Nonsan-si, Chungcheongnam-do PV                                 | 0.1                            | 0.206              |
|                             | Nonsan-si, Chungcheongnam-do PV                                 | 0.1                            | 0.206              |
|                             | Nonsan-si, Chungcheongnam-do PV                                 | 0.1                            | 0.206              |

| Installation Year            | Installation Area                   | Power Generation Capacity (MW) | ESS Capacity (MWh) |                |
|------------------------------|-------------------------------------|--------------------------------|--------------------|----------------|
| 2018                         | Nonsan-si, Chungcheongnam-do PV     | 0.1                            | 0.206              |                |
|                              | Nonsan-si, Chungcheongnam-do PV     | 0.1                            | 0.206              |                |
|                              | Nonsan-si, Chungcheongnam-do PV     | 0.1                            | 0.206              |                |
|                              | Buan-gun, Jeollabuk-do PV           | 0.495                          | 1.339              |                |
|                              | Gunsan-si, Jeollabuk-do PV          | 0.1                            | 0.206              |                |
|                              | Gunsan-si, Jeollabuk-do PV          | 0.1                            | 0.206              |                |
|                              | Gunsan-si, Jeollabuk-do PV          | 0.1                            | 0.206              |                |
|                              | Jeongeup-si, Jeollabuk-do PV        | 0.1                            | 0.206              |                |
|                              | Iksan-si, Jeollabuk-do PV           | 0.1                            | 0.206              |                |
|                              | Iksan-si, Jeollabuk-do PV           | 0.1                            | 0.206              |                |
|                              | Iksan-si, Jeollabuk-do PV           | 0.1                            | 0.206              |                |
|                              | Hongseong-gun, Chungcheongbuk-do PV | 0.1                            | 0.206              |                |
|                              | Jinan-gun, Jeollabuk-do PV          | 0.6                            | 1.712              |                |
|                              | Gangjin-gun, Jeollanam-do PV        | 0.099                          | 0.274              |                |
|                              | Gangjin-gun, Jeollanam-do PV        | 0.099                          | 0.274              |                |
|                              | Gangjin-gun, Jeollanam-do PV        | 0.099                          | 0.274              |                |
|                              | Gangjin-gun, Jeollanam-do PV        | 0.099                          | 0.274              |                |
|                              | Gangjin-gun, Jeollanam-do PV        | 0.099                          | 0.274              |                |
|                              | Haenam-gun, Jeollanam-do PV         | 1                              | 3.16               |                |
|                              | Sangju-gun, Gyeongsangbuk-do PV     | 0.5                            | 1.5                |                |
| Gangjin-gun, Jeollanam-do PV | 1                                   | 3.16                           |                    |                |
| 2018                         | Gangneung-si, Gangwon-do PV         | 0.3                            | 0.9                |                |
|                              | Gangneung-si, Gangwon-do PV         | 0.5                            | 1.5                |                |
|                              | Gangneung-si, Gangwon-do PV         | 0.5                            | 1.5                |                |
|                              | Gangneung-si, Gangwon-do PV         | 0.3                            | 0.9                |                |
|                              | Jangsu-gun, Jeollabuk-do PV         | 1                              | 3                  |                |
|                              | Gokseong-gun, Jeollanam-do PV       | 2                              | 7.2                |                |
|                              | Gokseong-gun, Jeollanam-do PV       | 0.099                          | 0.274              |                |
|                              | Cheonan-si, Chungcheongnam-do PV    | 0.952                          | 2.7                |                |
|                              | <b>Total</b>                        |                                | <b>37.83</b>       | <b>107.529</b> |

## Overseas Delivery Performance

| Installation Year | Installation Area | Power Generation Capacity (MW) | ESS Capacity (MWh) |
|-------------------|-------------------|--------------------------------|--------------------|
| 2019              | East Timor        | 0.03                           | 0.091              |
|                   | Thailand          | 0.25                           | 1.5                |
| <b>Total</b>      |                   | <b>0.28</b>                    | <b>1.591</b>       |

In 2018, 47 locations including 2,000 kW in Gokseong-gun, Jeollanam-do  
 In 2019, 55 locations including 1,600 kW in Wando-gun, Jeollanam-do  
 In 2020, 34 locations including Ochang 1,000 kW in Chungcheongbuk-do

▶ Domestic installation capacity: 42.105MW

Thailand 250kW  
 East Timor 30kW

▶ Overseas installation capacity: 0.28MW



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Beyond materials Associates

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