2023
SCEWC KOREA Pavilion

D

Green Energy

SSMI CONSULTING GROUP

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SSMI CONSULTING GROUP

SSMI Inc.

01 PV Integrated Monitoring System

SSMI CONSULTING GROUP

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Company Introduction

SSMI Inc. is big data analytic and AI software development company which is established in 2003 for providing consulting service such as company strategy, sixsigma methodology, cost reduction, quality improvement and product development.

Attic is machine-learning-base software development software company and experience for predictive modeling for manufacturing & service and Environment, Healthcare & Safety area.

E2Z is doing business in the area of Electrical construction, communication construction, photovoltaic components, smart grid (charging electric car), control panel, instrumentation control equipment, metallic structure and window construction, maintenance of wind power generation, new renewable energy business and development of new renewable energy infrastructure.

By using information collected from inverters and environmental sensors, SSMI, Attic and E2Z has work together and developed PV Integrated Monitoring System that has functions of real time monitoring for AI-based power generation prediction and fault diagnosis algorithms to provide better customer service.

PV Integrated Monitoring System can provide

- AI Based real-time fault monitoring and alarm function
- Monitoring Power generation and analysis of trend
- Increased generation efficiency through the power leveling function of the power compensator
- Provide real-time monitoring service through IoT RTU

01

PV Integrated Monitoring System

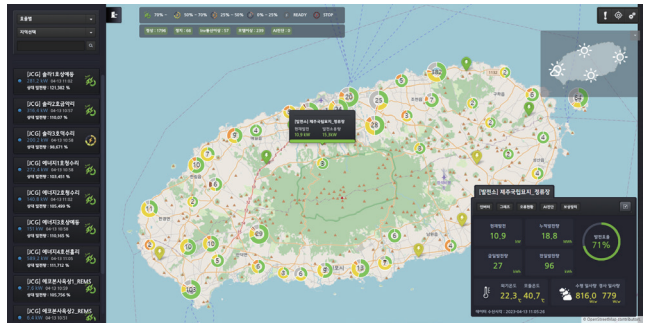
Technology / Product	PV Integrated Monitoring System
Detailed Genre	Photovolatic Power Plant(Renewable Energy) Monitoring Software
Product Type	Web Page(Chrome Recommended)
Target Company	Public Offices, Schools, Power Plant Operator, Private
Technology/Product video link	https://www.youtube.com/watch?v=6MiortgDWhI(An IoT-based Photovolatic power Integrated Monitoring System) https://www.youtube.com/watch?v=_fx4ygtJxQ8(IoT System Promotional Video) https://www.youtube.com/watch?v=oUcO9J4N3BM

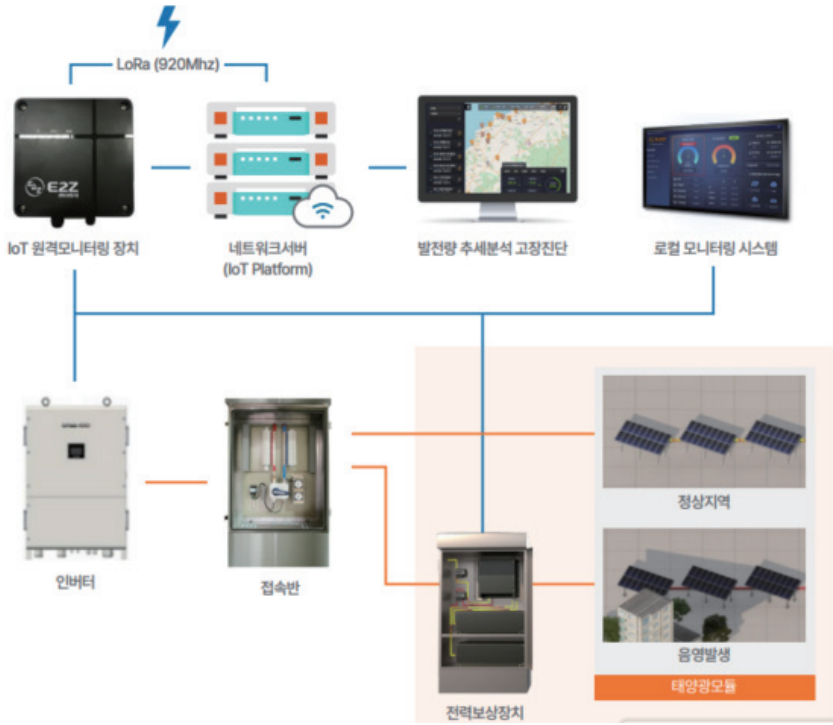
Contents Introduction

It is a monitoring software that provides users with information collected from inverters and environmental sensors by data collection devices installed in about 2,000 solar power plants in Jae-ju island, Korea, and provides status information of solar power plants based on AI-based power generation prediction and fault diagnosis algorithms.

Based on the collected power generation information, grouping is performed according to the trend of power generation by power plant, and fault diagnosis status information is monitored through an algorithm that performs fault diagnosis through comparison of power generation within the group.

In addition to the fault diagnosis algorithm, and advanced algorithm is provided by adding a power generation algorithm that can predict the power generation for the day and increase accuracy.




LoRa (920Mhz)
IoT 원격모니터링 장치
네트워크서버
(IoT Platform)
발전량 추세분석 고장진단
로컬 모니터링 시스템
인버터
접속반
전력보상장치
정상지역
음영발생
태양광모듈

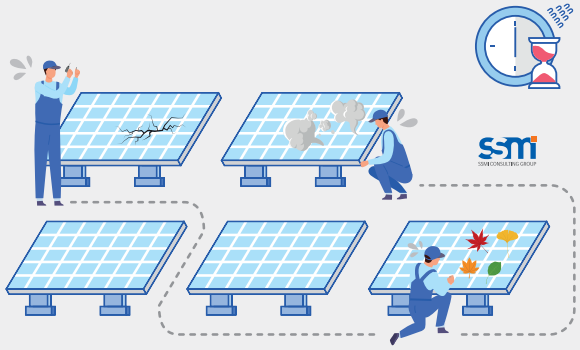

발전현황
70%
28.7 kW
RUN
용량 : 40.8 kW
태양광 발전량
현재발전 28.7 kW
전일발전량 193 kWh
금일발전량 42 kWh
누적발전량 75.3 MWh
전일발전시간 4.73
금일발전시간 1.03
월평균시간 1.03
연평균시간 3.41
외기온도 30.1
모듈온도 42.2
수평 일사량 290
경사 일사량 313
인버터어미디 Total
발전량 28.7 kWh
누적발전량 75.3 MWh
DC 61.4 487
LINE A 41.8 397
LINE B 41.6 398
LINE C 41.7 398
주파수 0Hz
Total 발전량 : 28.7 kWh
001 발전량 : 28.7 kWh
오류현황

AI Solar power plant fault diagnosis >>

Solution for smart AI fault diagnosis for solar power facilites

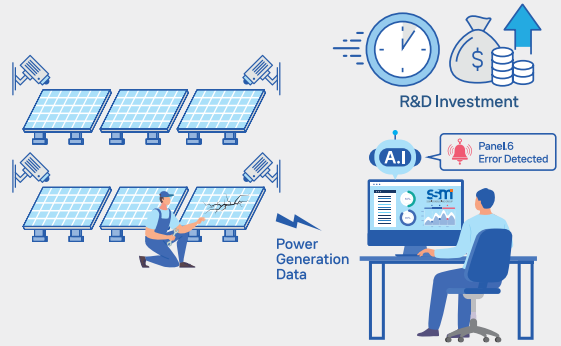
AS-IS

Fault diagnosis and estimation utilizing AI,
Accuracy of fault diagnosis (F1-score) 96.1%
and 6 times of emergency dispatch per month



TO-BE

Fault diagnosis and estimation, categorization of fault type utilizing AI,
Accuracy of fault diagnosis (F1-score) 94% and
less than 3 times of emergency dispatch per month



Category	AS-IS	TO-BE	Expected Effects
Accuracy of fault diagnosis (F1-Score)	F1-Score 91.6% (result of 1-year performance test)	Higher than F1-Score 94%	The fault can be checked and fixed fast
Number of emergency dispatch	6 times/months	Less than 3 times/month	Number of emergency dispatch is reduced by 50% Efficient operation of dispatch manpower Reinforce works for planned maintenance and preventive maintenance
Number of workers for monitoring	3 people	1 person	Reduction of the number of full-time workers for monitoring Labor cost saving by assigning other works to the workers

TousFlux
Big Data Analytics Solution

Google Marketing Platform
Certified

Golden Planet

01	Image Detection Algorithm, Data Visualization etc. / Wind Generator Artificial Intelligence (AI) Crack Detection Solution
02	NLP, AI document generation, Data mining, Data crawling, Prediction, Data Visualization etc. / Tousflux
03	Customer Analytics, Data Visualization / Google Marketing Platform(GCP)

GOLDEN PLANET
Go Beyond Data!

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GOLDEN PLANET
Go Beyond Data!

GOLDEN PLANET
Go Beyond Data!

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Company Introduction

GOLDEN PLANET has SaaS-based machine learning, deep learning artificial intelligence analysis technology, and Paas-based big data analysis and processing technology and continue to invest in research and development.
It utilizes cloud computing technology, to provide a digital transformation environment that can quickly adapt to rapidly changing environments. It provides consulting, education, data analysis, and software supply and infrastructure from big data analysis to marketing execution for the first time in Korea.
GOLDEN PLANET collects and accumulates internal and external data from all business processes within a company, including legacy systems, social media, distribution, and transactions, in a cloud infrastructure. At the same time, we utilize big data analysis technology to derive meaningful data insights and help reinvest them for business growth.
We live in a variety of information and data.
Golden Planet provides various insights to customers as a result of campaign operation and data analysis. For a better experience in everyday life, GOLDEN PLANET strives to understand users and make everything a reality.

2023 SCEWC KOREA Pavilion

01

Image Detection Algorithm, Data Visualization etc. / Wind Generator Artificial Intelligence (AI) Crack Detection Solution

Technology / Product	Image Detection Algorithm, Data Visualization etc. / Wind Generator Artificial Intelligence (AI) Crack Detection Solution
Detailed Genre	Green Energy
Product Type	Machine Learning Based Image Detection Solution
Target Company	Wind Generator safety inspection company
Technology/Product video link	

Contents Introduction

The Wind Blade Inspection Monitoring System is a service that allows for monitoring the risk level of defects in wind turbine blades.
It utilizes an image detection model to detect defects in the blades and provides information on the type and severity of defects by blade section.
The system offers the potential for higher detection performance through additional image training and hyperparameter adjustment within the dashboard. Users can receive decision-making support for turbine operation manuals and defect response manuals based on the detected risk level. With the ability to monitor and assess blade defects, the Wind Blade Inspection Monitoring System provides valuable insights for effective maintenance and operation of wind turbines, enhancing their overall performance. The system serves as a proactive tool for identifying and addressing some blade defects, minimizing downtime and improving the efficiency of wind energy generation. With its advanced capabilities, the Wind Blade Inspection Monitoring System contributes to the safe and reliable operation of wind power facilities, supporting the growth and sustainability of the wind energy industry.

< Wind Blade Inspection Monitoring >

02

NLP, AI document generation, Data mining, Data crawling, Prediction, Data Visualization etc. / Tousflux

Technology / Product	NLP, AI document generation, Data mining, Data crawling, Prediction, Data Visualization etc. / Tousflux
Detailed Genre	Marketing Technology / Big data Analytics Platform
Product Type	Artificial Intelligence Based Analytics Solution
Target Company	e-commerce, opinion survey, social marketing etc.
Technology/Product video link	

Contents Introduction

Tousflux is a platform to analyze mashup data from owned, paid, and earned media in various industries and discover insights.
TousFlux's Technical Stack is an analysis solution that collects, processes, and analyzes various data through independent data coverage technology to extract insights, and has many years of technologies and know-how in statistical analysis, data mining, and deep learning.

TousFlux

Big Data Analytics Solution

< Big data analysis platform TousFlux BI >

< TousFlux Data analysis process >

03

Customer Analytics, Data Visualization / Google Marketing Platform(GCP)

Technology / Product	Customer Analytics, Data Visualization / Google Marketing Platform(GCP)
Detailed Genre	Marketing Technology / Customer Analytics
Product Type	Artificial Intelligence Based Analytics Services
Target Company	e-commerce, opinion survey, social marketing etc.
Technology/Product video link	

Contents Introduction

GMP utilizes Google Analytics, an online customer behavior analysis stack among Google marketing platforms, and provides data planning, installation, inspection, guides, and training to provide optimized analysis infrastructure for various industries.
By utilizing the potential customer, acquisition, behavior, and conversion data collected by Google Analytics, we can gain insights into marketing performance analysis and customer behavior-based profile analysis for both users and our services.

Google Marketing Platform Certified

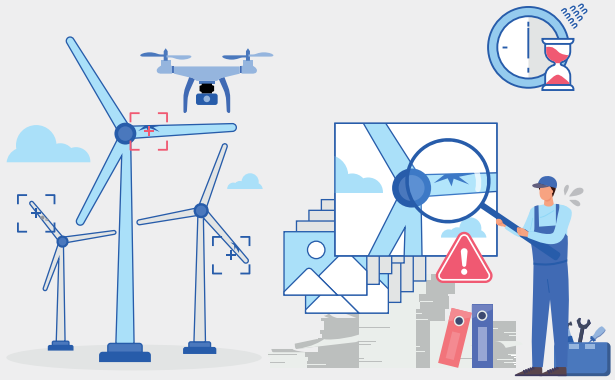
< Google Marketing Platform Certification >

AI fault detection >>

Development of a solution for AI-based wind turbine crack detection and risk diagnosis

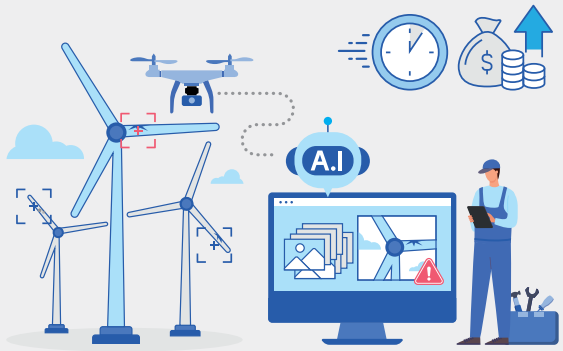
AS-IS

Blade crack diagnosis takes a lot of time as the engineer has to check it directly.

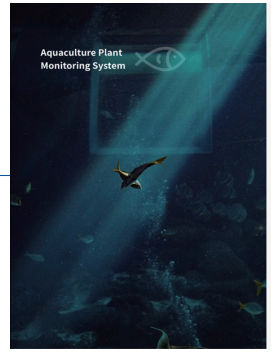


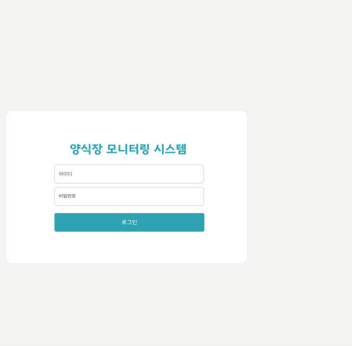
TO-BE

Improve productivity: the average time for diagnosing blade crack decreases (96.42 sec./piece → 5.99 sec./piece), cost saving (KRW 1.2M/case → KRW 960,000/case)



Category	AS-IS	TO-BE	Expected Effects
Time for blade crack analysis on average	Time for blade crack detection and risk diagnosis by an engineer About 96.42 sec./piece	Time for AI blade crack location detection and risk diagnosisAbout 5.99 sec./piece	Productivity increases by 5.63%
Accuracy of the blade crack location detection	The accuracy is higher than 80%	The accuracy is higher than 90%	Complement human errors that engineers may make, enhance reliability (The result depends on the engineer's level of skill)
Number of diagnosis available per month on average	10 cases	20 cases	Number of diagnosis available per month on average increases two-fold
Number of diagnosis and cost per year on average	Number of diagnosis per year on average : 120 cases Cost : KRW 1.2M per case	Number of diagnosis per year on average : 240 cases Cost : KRW 960,000 per case	Number of diagnosis per year on average increases two-ford Cost is reduced by 20% per case





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MetisInfo. Co.,Ltd

01 Pump Abnormal Detection AI Solution

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Company Introduction

MetisInfo Co., Ltd. is a platform specialist and strives to provide the best services in the fields of 'EV service', 'energy transaction service', 'Ai solution', 'RFID/USN', and 'LBS(location-based services)'.

We will provide the best 'Service Solution' that can respond immediately to customer needs by continuing research and development to meet the "digital transformation" in progress in all industries.

Under the motto "Our imagination makes our reality", we will acquire new knowledge based on technology development and research activities, and will constantly strive to provide the best service with sincerity by establishing a system that prioritizes support for our customers.

2023 SCEWC KOREA Pavilion

01

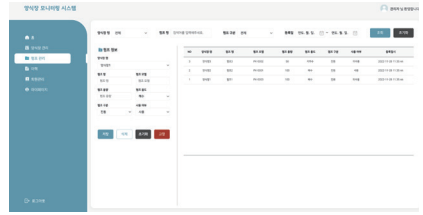
Pump Abnormal Detection AI Solution

Technology / Product	Pump Abnormal Detection AI Solution
Detailed Genre	· Representative H/W : Electric current and Vibration Sensor, Gateway etc. · Representative S/W : Electric current and Vibration sensor M/W, Data Model, Pump Error Monitoring System
Product Type	AI-based monitoring system
Target Company	Companies that need to predict errors by measuring electric current, vibration of Seawater/Groundwater pumps in fish farms
Technology/Product video link	· AI-based monitoring system tailored to fish farm operators · Accuracy of abnormal detection of farm pumps F1-Score 0.85 and achievement of pump abnormal detection rate ((1% calculated) → (85% expected)) · Dashboard UI/UX tailored to your convenience. · Modify and supplement UI/UX by exploring and reflecting the needs of users and demand companies.

Contents Introduction

· This solution is an AI system that predicts failures by measuring and monitoring the current and vibration values in real time from the fish farm pump motor.

Based on an AI model with an abnormality detection rate of 85% or higher, it is possible to preemptively respond to abnormal situations by detecting motor abnormalities and predicting motor failures, and creating a safe aquaculture environment.



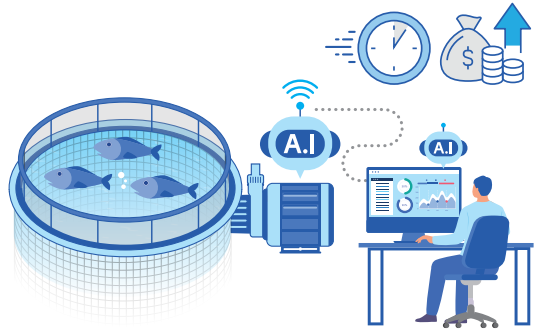
Development of pump anomaly detection algorithm for efficient operation of fish farms

AS-IS

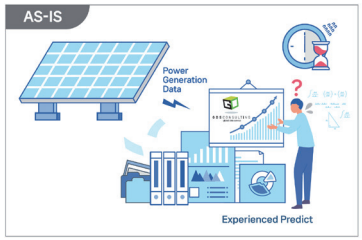
- The pump manufacturer visits the site once in a week or 2 weeks to monitor pump anomaly.
- There is no data that can be utilized to identify the anomaly (Workers have to rely on their sense)
- There is a limitation in taking an early response for risk such as collective death and virus infection caused by a pump failure.

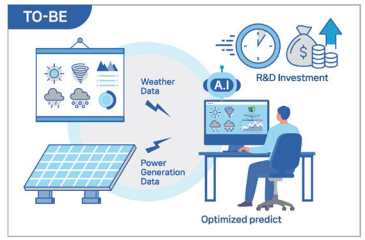
TO-BE

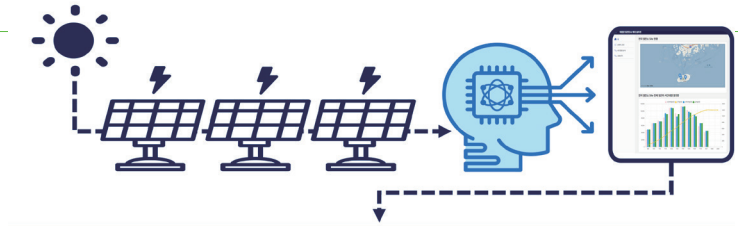
- Pumps in a fish farm can be monitored 24/7 utilizing a pump monitoring system
- Achieve 85% of pump anomaly detection rate
- Pre-emptive measures can be taken by using AI-based anomaly detection(save KRW 800M of cost of damage)

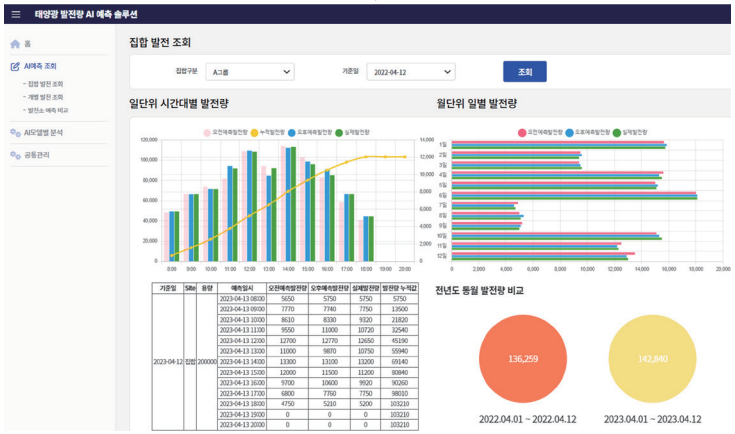


Classification	AS-IS	TO-BE	Expected Effects
Project goal	Collective death due to a pump failure, limitation in taking an early response	AI-based detection of fish farm pump anomaly	Pre-emptive measures can be taken for anomaly in a fish farm
Time	Maintenance workers visit the fish farm once in a week or 2 weeks	Real-time monitoring	Secure time for respond in case of anomaly
Accuracy	Anomaly detection rate 0%(no detection method)	Anomaly detection rate is higher than 85%	Enhance reliability in anomaly detection
Economic feasibility	1 person/day	0 person/day	Reduce labor cost
	Average loss in case of pump anomaly: KRW 1,000M : Collective death of fish, virus infection	Reduction of loss by 80% as the expected rate of loss decrease(KRW 200M) : Early response for damage in the fish farm	KRW 240,000M of damage loss is expected to be reduced when applied to about 300 fish farms
Qualitative comparison	Lack of efficient fish farm operation method	Introduce fish farm operation method including monitoring system etc.	Enhance efficiency of operation by introducing efficient fish farm operation method
	Lack of pre-emptive measures against collective death of fish and viruses	Pre-emptive measures for collective death or fish and viruses	









GDS Consulting Group Co., Ltd.

01 AI Solutions to Predict tomorrow's power generation at solar plants

GDS CONSULTING
global data service

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GDS CONSULTING
global data service

GDS CONSULTING
global data service

Company Name	***GDS Consulting Group Co., Ltd.***
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Company Introduction

We, GDSC, are a professional data consulting company that supports business success by providing data convergence construction, AI modeling, and future prediction algorithm technology based on big data value analysis.

Since its establishment in 2015, it has focused on pioneering new markets such as data convergence, AI modeling, building future prediction algorithm technology, data processing, analysis, and distribution.

Core business areas include AI modeling and AI learning data development, big data platform and center development, Telecommunications and population movement data statistical analysis consulting, data voucher processing supply and sales and distribution business, and GIS commercial analysis and solutions provision.

At the 2023 SCEWC NIPA Pavilion, we will showcase an AI intelligent solution that predicts the amount of solar power generation for the next day developed by us.

2023 SCEWC KOREA Pavilion

01

AI Solutions to Predict tomorrow's power generation at solar plants

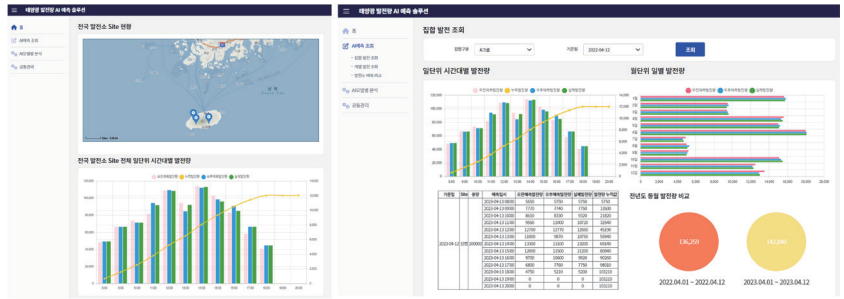
Technology / Product	AI Solutions to Predict tomorrow's power generation at solar plants
Detailed Genre	Prediction of solar power generation
Product Type	AI prediction algorithm
Target Company	Solar power generation business Company, etc.
Technology/Product video link	

Contents Introduction

It is an ai solution that predicts the tomorrow's power generation of the unit set solar power plant by hour by using only the weather forecast, past power generation data, and power generation facility capacity without the facility information of the power plant.

An AI prediction algorithm utilizing time-series AR(AutoRegressive) models and machine learning, based on correlation and pattern analysis between past weather information and over 1 million records of power generation data from various solar power plants

The solution for implementing RE-100(Renewable Energy 100%)!!
Utilizing AI prediction technology to optimize renewable energy management and for possible application in services.

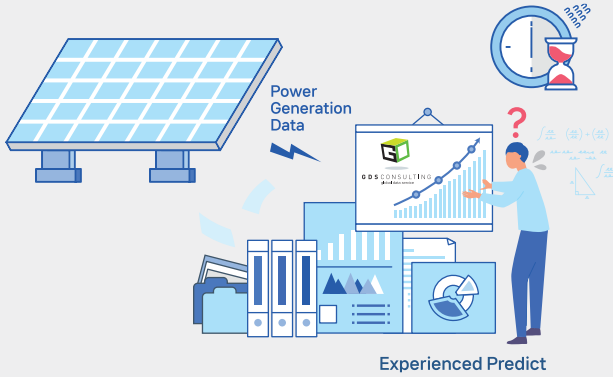


Optimization of power generation >>

Solution for AI-based daily power generation forecasting at solar power plants

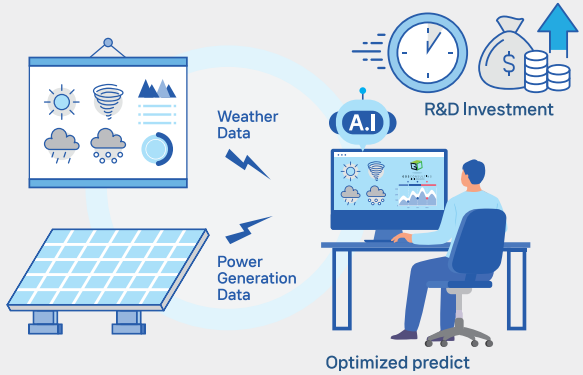
AS-IS

Energy management in manual and intermittent manner depending the capability of worker, high error rate of power generation forecast, difficulty in power resource management

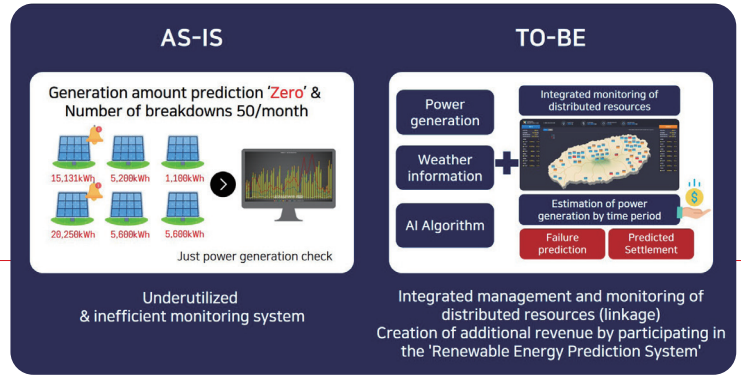


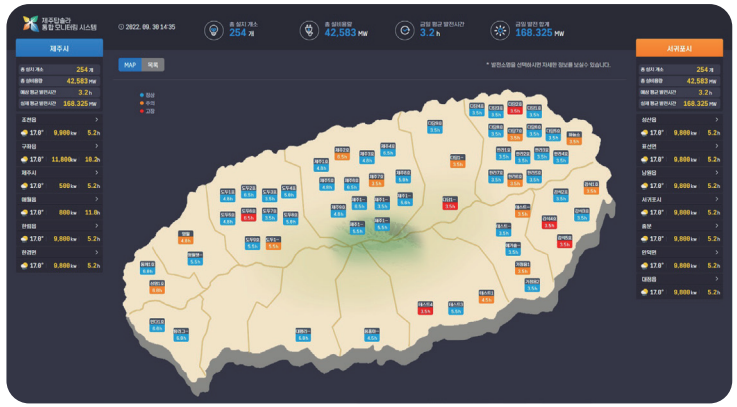
TO-BE

AI-based power generation forecasting at aggregate power resource(power plant) of buyers!
Participate in KPX forecast system => Rise in revenue by KRW 36M on a yearly average



Category	AS-IS	TO-BE	Expected Effects
How to forecast power generation	Utilize predicted value estimating based on past annual statistics	Forecasting by using AI-algorithm considering variables in the external environment including weather forecast etc.	Management of energy from power stations scattered in various places
Error rate of photovoltaic power generation forecast	Forecast daily power generation by predicting the annual power generation Calculated in 30% of error bound	Achievement of less than 10% monthly average error rate in forecasting power generation by time of Distributed Generation Resources	Increase in revenue by participating in KPX renewable energy forecasting system, Production of power based on accurate forecast on a daily basis/Supply-demand management can be expanded(compared to power transaction)
Number of forecasts for the next day	0 time/day (Employees make decision when necessary)	Submit error rate for KPX 2 times/day (max 8 times/day, Forecasting for the next day is available 8 times based on today)	Forecasting responding to changes of time-based weather forecast of today
Note	• Earned incentive by participating in “Renewable energy forecasting system” of Korea Power Exchange(KPX) in the 2nd year(2023) - Incentive calculation(error rate) higher than 8~6% :KRW 3 /kwh, Less than 6% : KRW 4/kwh * Incentive may change depending on the KPX policy for forecasting system policy		





NEXTEZ.Corp.

01	Solar power plant power generation prediction solution using automatic weather monitoring equipment (AWS)
02	Solar power plant generation prediction monitoring system

e-Business Partner NIEIXIT EZ

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e-Business Partner NIEIXIT EZ

e-Business Partner NIEIXIT EZ

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Fax	+82-26-0816
E-mail	jh12299@nextez.co.kr
URL	www.nextez.co.kr

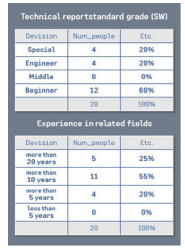
Company Introduction

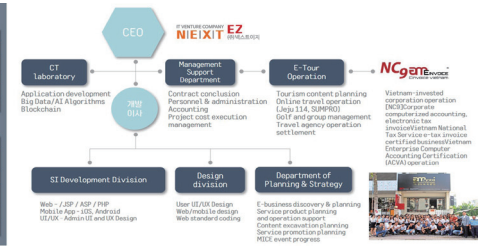
NEXTEZ.Corp. is a web page developer and e-business solution builder, it started as a multimedia lab in 1995. In accordance with the paradigm of developing user-centered solutions under the web environment, it was incorporated as NextG Co., Ltd. in 2000 and is engaged in key IT&CT business areas.

Company name	NEXTEZ.Corp.
Date of establishment	October 24, 2000
C.E.O	Kang Joo-kyung
Technical service registration field	E-Business System, Mobile Solution & Game, Digital contents, IT Convergence etc
Location	245-13, Cheomdan-ro, Jeju-si, Jeju-do, Republic of Korea
Type of business	Software development, web design, telecommunications construction, e-commerce, mail order, travel arrangement, DB construction, R&D business

NEXTEZ.Corp. has various online service-based research and development know-how, and based on systematic organization,By actively collecting customer requirements, we are constantly researching and developing items for service improvement, customer business support, and win-win.

< Major business performance (overseas subsidiaries) >
Established 'NC9', a local investment corporation in Vietnam in 2013 / Launched corporate computerized accounting program ASP commercial service / 2019 'Selected as one of Vietnam's top 10 promising companies' Export performance of $30,000 to $50,000 per year.
We are demonstrating domestic self-developed services in Vietnam, acquiring market size and statistical information through a local subsidiary in Vietnam, and maintaining contracts with overseas customers.





Certification Status

GS certification	• Software quality certification (v1.0 ecM-Maker)	•12-0172
	• Software quality certification (Sukso114v1.0)	•12-0208
	• Software quality certification (MICE-NICEv1.0)	•13-0159
	• Software quality certification (TicketNice(TiNi) v1.0	•14-0183
	Software quality certification (s-WEMSv1.0)	•15-0108
	•Software quality certification (NICE content man v1.1	•17-0563
	•Software quality certification (Jeju Biological Resource Common Management System v1.0)	•18-0570
	•Software quality certification (AMNOTE v21.1.11)	•19-0408
Enterprise certification	• Certified as a venture business	•제20180402770호
	• INNO-BIZ	•제885043-07515호
	• Corporate affiliated research institute	•제20081106268호
	• Software business report confirmation	•020-192065
	• Trade Business Registration Certificate	•45347782
	• Transparent Management Certificate	•2005-1024호
	• MAIN-BIZ	•제160404-02044호
Awards	• Minister of Knowledge Economy Award	•제79727호
	• Minister of Commerce, Industry and Energy Award	•제7343호
Patent registration	•Power consumption scheduling system for smart grid and its scheduling method	•제10-1273934호
	•Reserved charging system for electric vehicles	•제10-1341415호
	•Development Forecasting model-based planning and sales operation system	•제10-1472861호
Patent	•Multiple admission ticket issuance system and method using RFID	•10-2006-0057937
	•Method and device for providing web page with voice	•10-2009-0104642
	•Intelligent learning type image search method and system based on semantic database applying object identification	•10-2010-0048161
	•Agricultural production prediction management system linked with sensor network	•10-2011-0080962
	•Media on which the integrated accounting management program between different languages is recorded	•10-2011-0130913
	•Electric vehicle characteristic-based tour scheduling service operating system	•10-2014-0042390
	•Open API based discount ticket sales operation support system	•10-2014-0058390
	•Restaurant recommendation system and method based on consumption patterns and atypical big data	•10-2016-0167186
	•A Study on the Application of Recommendation Algorithm AHP Technique for Restaurant Priority Extraction	•2017-0151239
Trademark registration	•Trademark registration for integrated golf platform 'SUMPRO』	•40-1753296

Solutions and commercial services

01

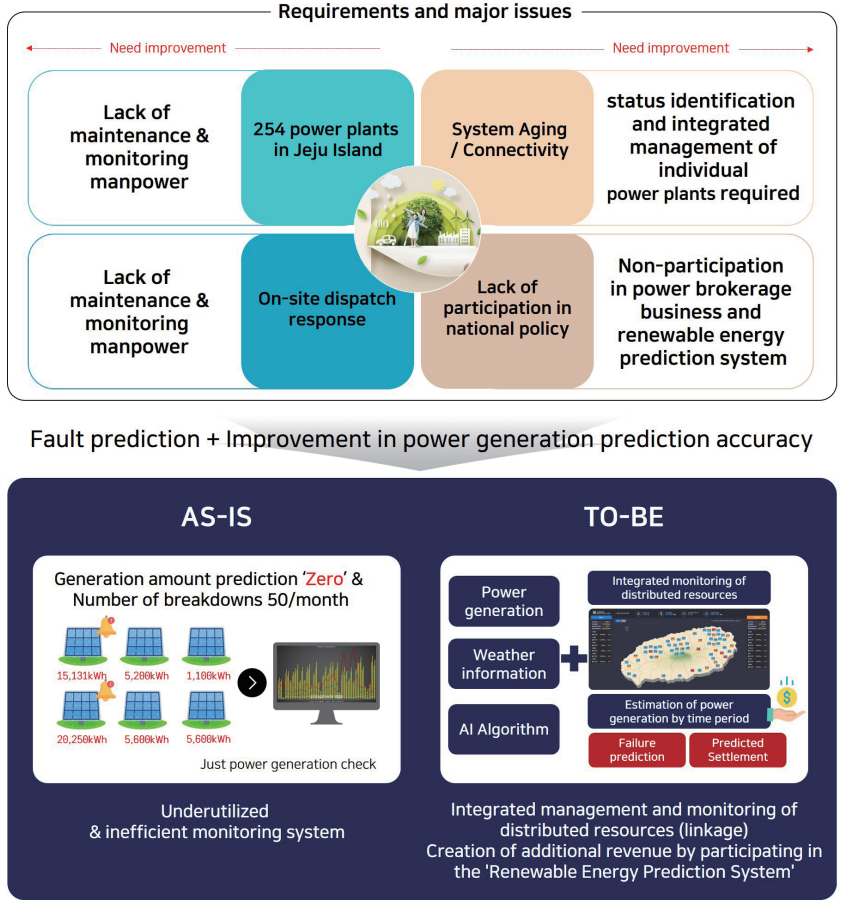
Solar power plant power generation prediction solution using automatic weather monitoring equipment (AWS)

Technology / Product	Solar power plant power generation prediction solution using automatic weather monitoring equipment (AWS)
Detailed Genre	Solar power plant in Jeju Island, South Korea
Product Type	SoftWare(System) - aialgorithm
Target Company	JejuTopSolar Co.,Ltd.
Technology/Product video link	

Contents Introduction

- Increased efficiency in operation and management of 254 power plants in Jeju Island owned by 'JejuTopSolar Co.,Ltd.,' a demand company
- Development of a power generation prediction solution through 'Energy Management Intelligent AI Convergence Technology' to help expand business in the future
- Expected to expand business and increase sales by entering the virtual power plant power brokerage business by drastically improving forecast error and strengthening forecasting technology by introducing power generation prediction algorithm
- For the first time in Jeju Island, it is possible to customize the characteristics of island regions and predict the amount of power generation by region
- Positioned as the best company in the province in the field of solar power construction and operation management through synergy effects with maintenance experts and equipment
- **Building a training dataset**
  · Solar power plant generation data
  · Inverter data
  · Weather data (Meteorological Administration API, AWS installation)
- **EDA/Analysis**
  · 70% of training data (28,000)
  · 10% Verification data (4,000)
  · 20% test data (8,000)
  · Between power generation data and meteorological data
  · Correlation analysis (insolation prediction)
- **Deep Learning Algorithm Implementation**
  · Development of power generation prediction model based on recurrent neural network
  · RNNs/LSTMs/GRUs
- **95% accuracy**

Target Company | TOP SOLAR JEJU Developer | IT VENTURE COMPANY NEXIT EZ (주)넥스트이지



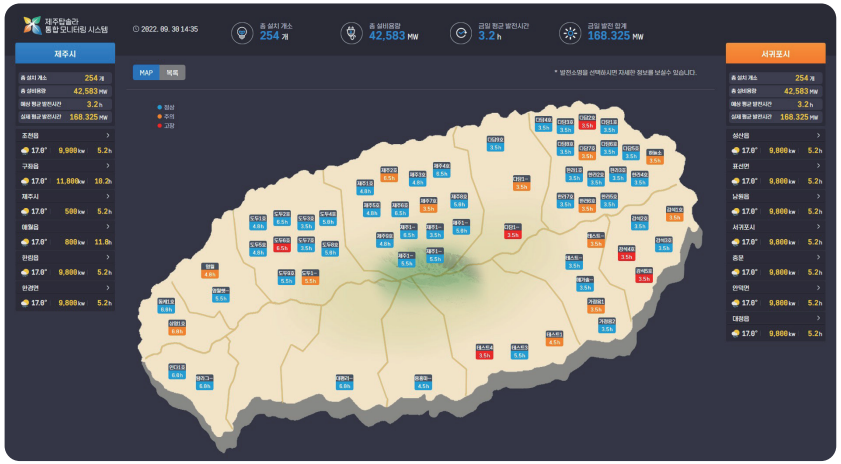
02

Solar power plant generation prediction monitoring system

Technology / Product	Solar power plant generation prediction monitoring system
Detailed Genre	Solar power plant in Jeju Island, South Korea
Product Type	SoftWare(System)
Target Company	JejuTopSolar Co.,Ltd.
Technology/Product video link	

Contents Introduction

AI algorithm applied power generation prediction and fault diagnosis - integrated monitoring system

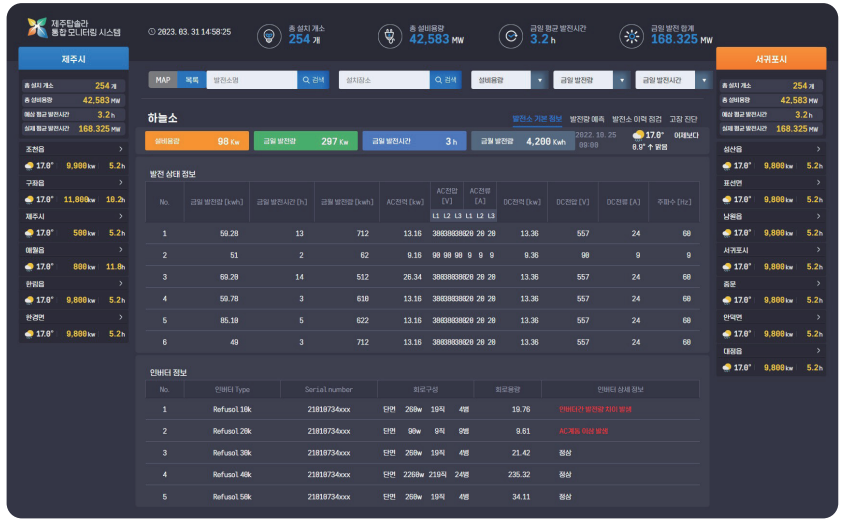


- **Accurate location display on the power plant map in Jeju Island**
  - · Total installation locations
  - · Total installed capacity
  - · Expected average power generation time
  - · Actual average power generation time
  - · Total average power generation for the day
  - · Weather information by town, township, or dong

- **Power generation information for each power plant in Jeju Island**
  - · Generation time for each power plant,
  - · Power generation (daily/monthly)
  - · Search conditions by power plant information
  - · Enter detailed power generation information by power plant

- **Power generation forecast information**
  - · Comparison of today's and tomorrow's power generation by time zone (prediction)
  - · Cumulative power generation, solar radiation, temperature, wind speed information

- **Power plant troubleshooting information**
  - · Panel failure diagnosis for each power plant facility (prediction)
  - · Detect anomalies by MAP icon color



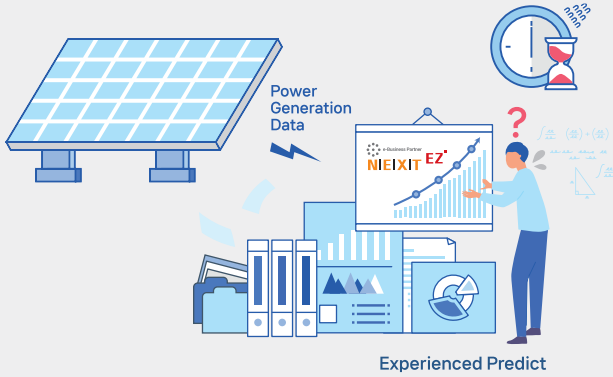
NEXTEZ.Corp. is a leading ICT company in Jeju Island that is optimized for the development of any type of 'integrated monitoring system' as well as this system.

Major Business Performance

Solution for generation forecasting of solar power plants connecting to AWS

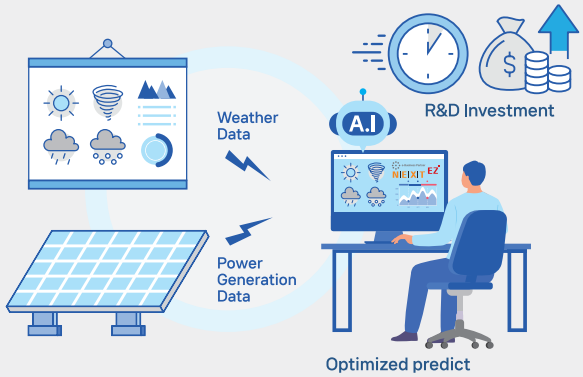
AS-IS

Estimate data based on statistics of the amount of power in the past
(Inefficiency in distributed power resource management and works)



TO-BE

Report on daily/monthly generation forecasting by plant and diagnosis /
Provide generation forecasting data to receive incentive (for submission)



Category	AS-IS	TO-BE	Expected Effects
Man-hours efficiency (Generation forecasting and writing diagnosis reports)	30 min. (1 station)	5 min. (1 station)	Reduce labor cost by 1/6 (Equivalent to a reduction of about KRW 42M per person)
Revenue (Power brokerage incentive)	0	Max KRW 70M(year)	Incentive by participating in small power brokerage business at power exchange Create added revenue

Infomind.co.,ltd

01 Solar Plant Integrated Monitoring System

INFOMIND

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INFOMIND

INFOMIND

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Company Introduction

Infomind Co., Inc, has a SW convergence technology business model based on its global competitive edge.

A company that creates new values under the proposition of information and human convergence!

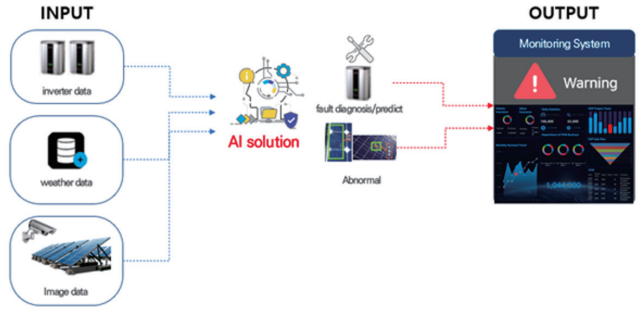
The company was established in Jeju Special Governing Province, South Korea, a world-class tourist island. We have tried convergence IT solutions with Smart tourism, Clean bio-industry, and Green energy.

Our solid management capabilities, technological prowess and, above all specialized technical human resources can guarantee continuous customer support and ensure stable system operation.

Growing into the world's leading company in the IT.CT field, We are Infomind!

AI Solution

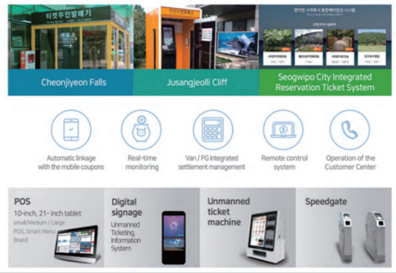
The technology that processes real-time weather information and data collected from devices in a circular manner through AI solutions for predicting solar power generation and diagnosing faults obtain and integrate with the plant monitoring system.



INPOS Total Solution

The Infos Total Solution is a new management environment system that provides various platforms such as POS, unmanned ticket machine, speedgate, etc. according to the functions that customers need and provides the best service for smooth operation.

With reliable hardware and differentiated software, customized services are available for each customer.

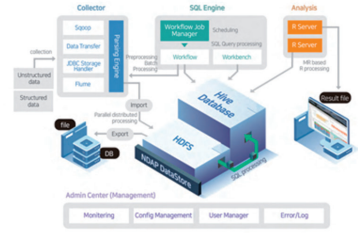


Big Data Platform

We build a formal data mart by collecting and refining informal and formal data and provide it as a visualization service through R-based big data analysis.

Big Data Platform

We create public value by providing a variety of big data services. By analyzing big data integrated platform and public big data (illegal parking/ civil complaint) of Jeju Special Self-Governing Province and analyzing the big data regarding festivals held in Seogwipo City, etc.



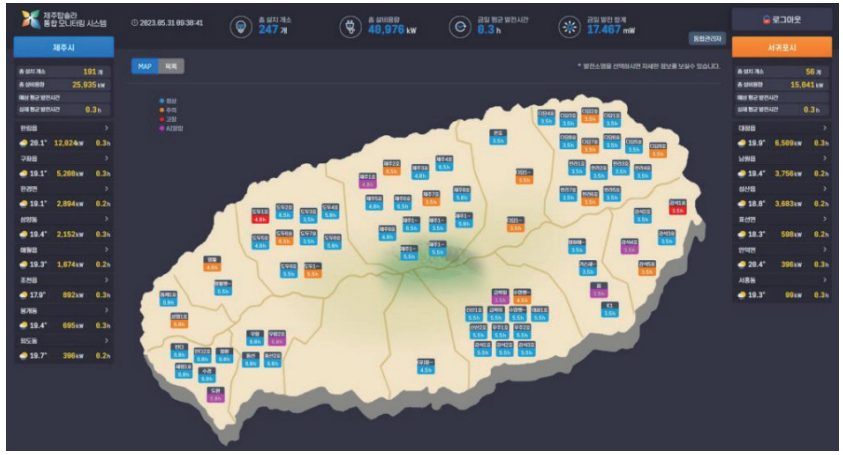
01

Solar Plant Integrated Monitoring System

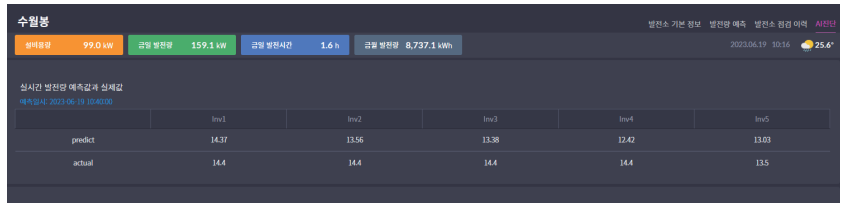
Technology / Product	Solar Plant Integrated Monitoring System
Detailed Genre	Solar power plant in Jeju, South Korea
Product Type	software
Target Company	Solar power plant O&M companies
Technology/Product video link	

Contents Introduction

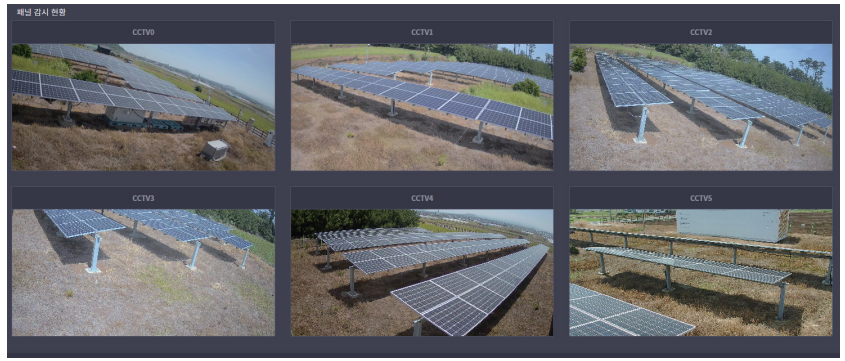
It is an integrated monitoring system for solar power plants that incorporates AI technology can be used by solar power plant O&M companies. It is a system that automatically monitors inverters of facilities and solar panels by analyzing real-time data from CCTV and weather data.
The key technology is
First, it is an inverter fault diagnosis solution with AI, and it is possible to determine whether an inverter has failed based on the difference between the predicted and actual power generation from solar panels by comparing real-time inverter data with weather data.
Second, it is a CCTV image analysis solution applied with AI. The AI solution analyzes regularly and automatically CCTV images from the solar power plants. If the system detect some problems, display 'alert' or 'warning' sign.



< Solar Plant Integrated Monitoring System >



< Inverter fault diagnosis AI solution >



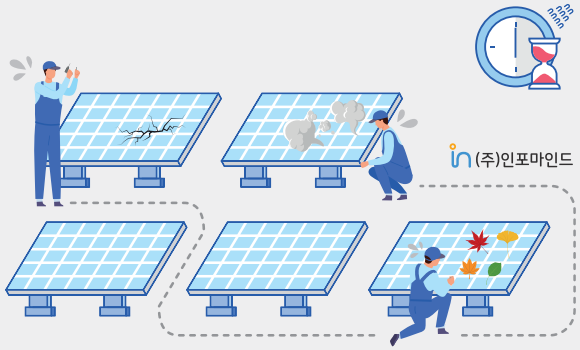
< CCTV image analysis AI solution >

AI fault analysis >>

AI-based fault diagnosis management solution for solar power plant facilities

AS-IS

Inefficient method as the Workers monitor solar power plants with naked eyes and visit the power station for monitoring the solar panels



TO-BE

Improve efficiency of management as the monitoring system of the power plant applies AI model for real-time monitoring and analysis
(Cost saving of about 50M per year)

Category	AS-IS	TO-BE	Expected Effects
Monitoring method	Workers monitor with naked eyes	Automatic monitoring using AI solution	Number of human errors made by workers are expected to be reduced.
Number of workers for monitoring	1 person	0	Reduce labor cost of monitoring workers
Number of workers for regular check	1 person	0 (Labor cost saving for one worker per year : about KRW 32,000,000)	Workers who are in charge with monitoring breakage due to typhoon or man-made causes can be replaced with AI model for solar panel monitoring
Cost of maintenance for a power station(per month)	KRW 61,826/month X 253 stations = KRW 15,641,978	KRW 55,644/month X 253 stations = KRW 14,077,932	10% of cost saving
Accuracy of AI in estimating power generated from solar panels	AI is not applied	96%	

2023 SCEWC KOREA Pavilion

FLEXINK

01 The system for EV battery SOH prediction and comparison

02 Battery state prediction solution for large electric vehicles(EV buses)

FLEXINK

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FLEXINK

FLEXINK

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Company Introduction

FLEXINK, a combined word of Flexible and Think, is a company that delivers clients' WANTS beyond clients' NEEDS through flexible thinking. FLEXINK is a professional data analysis company, conducting various analysis and technology development using big data from public and private SI services. we also provide analysis using AI technology, in various fields such as sentiment analysis of SNS data, sensor data prediction, battery condition diagnosis, and personalized product recommendation to help partner companies develop their technology.

For those purposes, Flexink has possession of data collection and processing, analysis and visualization, and AI modeling technologies. Descriptions of the technologies are as follows.

Data Collection and Processing Technology: Just as good cooking requires fresh ingredients, securing high-quality data is essential to developing high-level artificial intelligence (AI) technology.

Data Analysis and Visualization Skills: To understand complex data and identify trends, outliers, and patterns, data visualization is essential. Flexink utilizes various types of charts and visualization tools to discover value in data and help customers make data-driven decisions. Flexink has its own crawling system for web data collection, furthermore, uses Jeju Data Hub, public data, and private data to classify data through collecting and labeling. In addition, data quality is controlled by experienced analysts using Python to perform missing values, outlier checks, and basic statistical analysis to manage the quality of the collected data.

AI modeling technology: Among artificial intelligence technologies, machine learning and deep learning are important technologies that allow computers to learn, classify patterns, and predict values. Flexink uses machine learning and deep learning technology to develop and provide AI services such as image classification, natural language processing, recommendation systems, prediction, and analysis to customers.

01

The system for EV battery SOH prediction and comparison

Technology / Product	The system for EV battery SOH prediction and comparison
Detailed Genre	
Product Type	EV battery SOH prediction AI solution
Target Company	Electric Car Battery related Research Institute
Technology/Product video link	

Contents Introduction

With the increasing spread of electric vehicles, the importance of measuring the residual value of electric vehicle batteries has increased. For both the customer's efficiency·safety and the economic and environmental value of waste batteries.

In the past, it took at least 6 to 7 hours to measure the residual value because the battery had to be removed by specialized personnel and equipment. But with AI-based battery residual value prediction system, only requires information about the vehicle, the surrounding environment, and the charging data (short time) so it takes a lot shorter to diagnose the residual value of the electric vehicle battery.

02

Battery state prediction solution for large electric vehicles (EV buses)

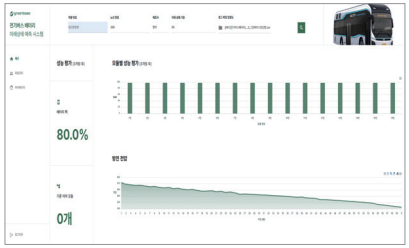
Technology / Product	Battery state prediction solution for large electric vehicles(EV buses)
Detailed Genre	
Product Type	Battery state prediction AI solution for large electric vehicles (EV buses)
Target Company	Large Battery related Research Institute
Technology/Product video link	

Contents Introduction

When the performance of lithium secondary batteries used in electric vehicles decreases to less than 70% of their initial capacity, problems such as reduced mileage, reduced charging speed, and increased risk of stability occurs, so electric vehicle battery management is essential.

However, the large-capacity battery management system used in current electric buses is difficult to manage and low-efficiency because it is tailored only to the battery pack without considering the battery module.

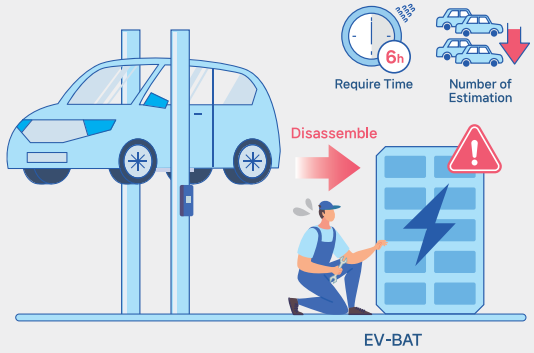
'Electric Bus Battery Future Condition Forecast Solution' can easily diagnose the state of the battery with the voltage and current data of the electric bus collected during operation and diagnose the state of the large-capacity battery in module units based on AI, thus managed with higher efficiency.



Establishment of the system for EV battery SOH estimation and comparison

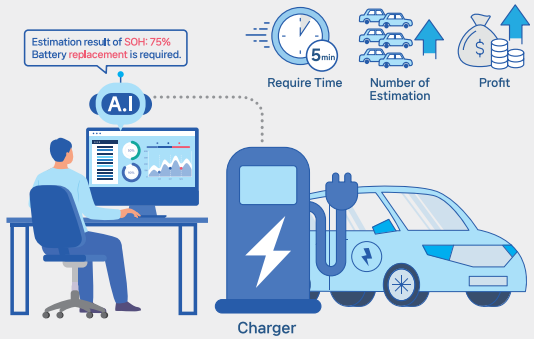
AS-IS

- It takes 360 minutes to estimate the SOH.
- Full-time workers need to be stationed(more than 2 workers) to test EV batteries.
- Works for disassembling of the battery are required.
- The current estimation system with high-cost-low-efficiency needs to be improved and the safety needs to be enhanced.



TO-BE

- The efficiency will be maximized by reducing the time to evaluate the SOH(360 min.->5 min.)
- The number of tests and analysis will increase from 20 cases -> 1,920 cases per month(96x improvement)
- The cost is reduced from KRW 1.5M to KRW 55,000 per case.

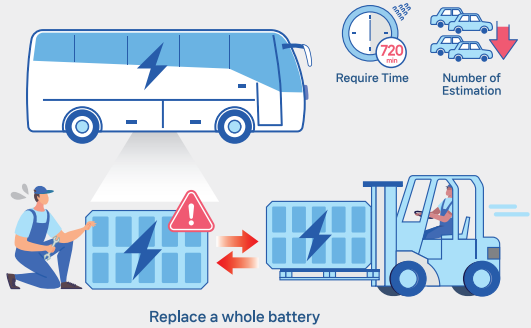


Category	AS-IS	TO-BE	Expected Effects
How to estimate	A complicated process that requires experts and dedicated device for charging > relaxation time > discharging > disassembling of EV batteries	AI solution estimates the SOH without any complicated process, while the EV is being charged.	Streamlining the work, reducing the time required for analysis
	The battery has to be removed from an EV for estimation of the SOH.	The SOH of batteries installed in the EV can be estimated.	Lowering the entry barrier of EV battery SOH estimation
Cost of estimation	KRW 1.5M/case	KRW 55,000/case(cost of charging is excluded)	Cost of EV battery SOH estimation is reduced by 96.33%
Time spent for estimation	It takes about 360 minutes for battery disassembling and analysis of experts.	It takes about 5 minutes for AI analysis	Time required for EV battery SOH estimation is reduced by 98.62%
Number of estimations available per month on average	20 cases/month	1,920 cases/month	The number of SOH estimation is increased by 96 times

Development of battery state estimation solution for large electric vehicles(EV buses)

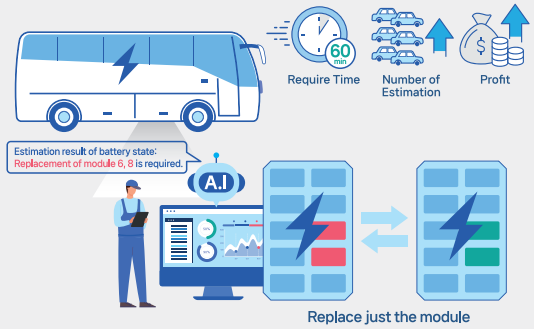
AS-IS

- Works for removing and disassembling of batteries are required to measure the battery performance of an electric bus.
- More than 2 workers are required for testing the battery of an electric bus
- The performance check and replacement of the battery is carried out by battery pack.
- The cost is high as the battery has to be replaced by pack.



TO-BE

- The status of battery can be simply identified by using data loggers.
- Reduce time for performance check of batteries for electric bus
- Time for analysis 720 min. -> 60min. (cut by 91.67%)
- The cost of battery analysis KRW 20M/ month-> KRW 40M (rise by 100%)



Category	AS-IS	TO-BE	Expected Effects
How to estimate	The battery has to be removed from the electric bus to estimate the state.	The battery state can be estimated only by checking the battery status log during operation of the electric bus	Lowering the entry barrier of performance estimation of electric
Efficiency of battery replacement	The performance check and replacement of the battery is carried out by battery pack	The performance check and replacement of the battery is carried out by battery module	Cost reduction, increase in work efficiency
Cost of battery replacement	KRW 2M/case*10case/ month KRW 20M/month	KRW 200,000/case *200case/month KRW 40M/month	Increase in profit as the number of testing increases through cost reduction
Time spent for estimation	Time spent for battery removal, expert's analysis: about 720 minutes	Time spent for AI analysis about 60 minutes	Time spent for electric bus battery state is cut by 91.67%

Nepirity

01 Intelligent Energy Management
AI-based Power Storage System
AI predicts Power Demand and Generation

NEPIRITY

22

NEPIRITY

NEPIRITY

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Company Introduction

Nepirity is a company that specializing in **AI modeling** and **Data analysis** solutions. Our AI-powered solutions cover the entire process of collecting, processing and analyzing the data.

We offer **API services** providing **proprietary technologies** such as anonymization, masking, AI-powered sentence summarization, and keyword extraction to utilize in social networks and media.

Our services support the **entire process of data analysis** from collecting data to preprocessing, retraining and utilizing various APIs as data pipelines and AI models.

We are working on the project of **AI predictive modeling** for intelligent **energy management.** This project automates managing the system of energy storage and improves efficiency in the field of renewable energy. Our ultimate goal is to contribute to **developing smart cities** with the convergence of renewable energy and AI.

In the future, we aim to **expand our expertise** into other fields and continue to provide innovative solutions in the **global market**.

2023 SCEWC KOREA Pavilion

01

Intelligent Energy Management and Storage System with AI-Powered Power Demand and Generation Prediction

Technology / Product	Intelligent Energy Management and Storage System with AI-Powered Power Demand and Generation Prediction
Detailed Genre	Artificial Intelligent, Energy Management
Product Type	Software & Algorithm, Cloud service
Target Company	Companies that are interested in energy management, cloud services and AI
Technology/Product video link	https://www.nepirity.com/system/ems/

Contents Introduction

Our intelligent energy management and storage system predict power demand and generation using advanced AI models. We provide automatic switching between charging and discharging to optimize the energy utilizing electric meter, PV(photovoltaic) inverter, and APIs from KEPCO and KMA.

*KEPCO : Korea Electric Power Corp.
*KMA : Korean Meteorological Administration

1. Expected effect
- **Accurate ESS** charge/discharge scheduling through predicting power generation and usage
- **Increase** efficiency by **90%** of charge/discharge compared to manual operation
- Realize economic benefits with an intensive charge when operating system of ***PlusDR**

*PlusDR(Demand Response) : System provides incentives when using the power as much as supply exceeds demand at certain times

2. Key Performance Values
- Charge/Discharge determination **time** : within **10 seconds**
- Mean Absolute Percentage **Error** : **Less than 7%**

3. Process
- Predict power usage based on weather and power usage data
- Predict power generation linking PV generation and weather data
- Change into ESS charge/discharge state by estimating final power consumption predicting power usage and PV generation.

Intelligent Energy Management System

Delivered as an IaaS cloud service

Shorten and reduce

- **Reduce** at least **28x** of Outlier detection analysis time
- Up to **4x** reduction in power demand analysis
- Reduce costs of electricity operation

Improved efficiency

- Prediction based on **Real-time** analysis
- Increased predictive **accuracy,** ESS operation **efficiency**
- **Peak** management

Flexible operation

- **Automated** ESS charge/discharge scheduling.
- **Adapted** operation for environment and power demand

- ✓ Predict power demand
- ✓ Predict scheduling efficiency
- ✓ ESS auto-scheduling (charge/discharge)

Data collection and prediction

Sensor

Instrument – Power consumption

Inverter- Solar generation

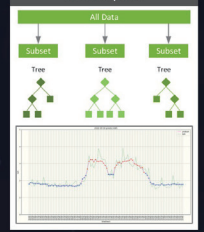
Hourly power consumption and solar power generation collection

API

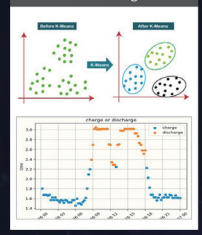
KEPCO

Korea Meteorological Administration

Prediction Power Consumption



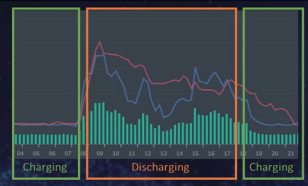
ESS charge/discharge scheduling



Tuning the predictive model

- Difference between the predicted value and measured value
- Additional learning of solar power generation
  -> Minimization of error

Conversion state - charge/discharge



- ESS charge-discharge state conversion based on final adjusted forecasts

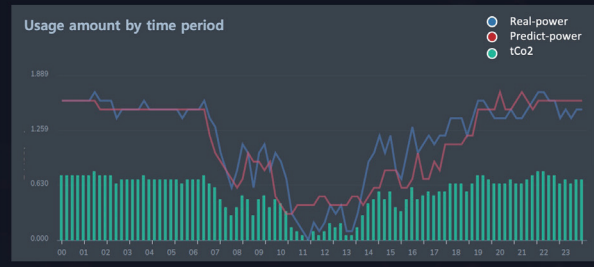
Expansion of applicable fields

Energy management technologies such as electric power, solar power, and wind power

AI-linked data analysis technology

The Key Components of the Dashboard

Visualization of power consumption prediction



- ✓ Red graph represents the model's predicted power demand for today, over a 24-hour
- ✓ Reforecasting every 15 minutes based on actual power usage
- ✓ Blue graph represents the actual power usage collected through sensors and APIs, updated every 15 minutes
- ✓ Green bars represent the carbon emissions provided through the API, updated every 15 minutes

- Usage rate compared to the predicted
- Increase compared to the previous day and average usage

Key data used for training.

Weather forecast

Id	Region	Temp.	Precip.	Hum.
24139	제주	22	0	78
24138	제주	22	0	74
24137	제주	23	0	68
24136	제주	23	0	70
24135	제주	23	0	67

Historical data

Id	Usage	Avarage	Co2
126708	1.508	1.54	0.001
126707	1.46	1.527	0.001
126706	1.428	1.503	0.001
126705	1.5	1.554	0.001
126704	1.448	1.569	0.001

- ✓ Weather forecast data that includes the key parameters used by the prediction model
- ✓ Training the prediction model based on historical power consumption data

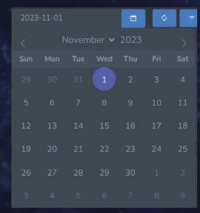
Power and cost figures.

- Key indicators related to power consumption (such as cost, usage at the same time, etc.)
- Retrieving the ESS charging and discharging states based on predicted values

Visualization of historical data over a specific period

- ✓ White bars represent the total power consumption per day over a period of 3 months
- ✓ Blue bars represent the daily carbon dioxide (CO2) emissions in metric tons over the previous 3 months, categorized by date

Retrieving records



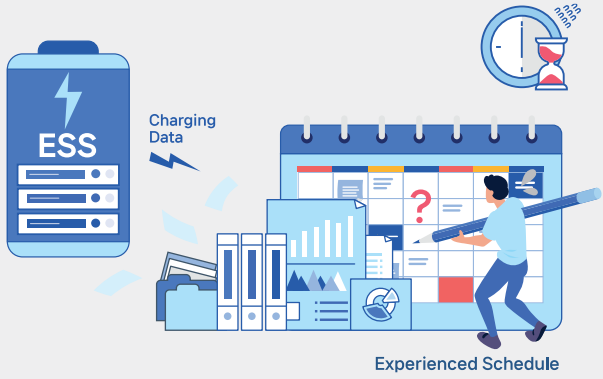
- Providing a feature for retrieving previous data.
- Long-term data retrieval using a database

AI convergence technology >>

Development algorithm forecasting efficiency of ESS charge and discharge linked to EMS

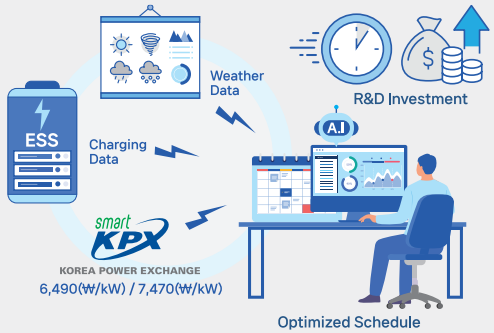
AS-IS

There is no system forecasting efficiency of ESS charge/discharge,
it has been operated by **human in a fixed and manual way**



TO-BE

Forecast power-demand, detect abnormal power usage
Reduce scheduling time by 28 times (120 sec→4.2 sec)
Save 140 KRW per kwh (a savings of 65%)
Save 12M KRW annually (0.98M KRW / a month)



Category	AS-IS	TO-BE	Expected Effects
Time for forecasting power demand	Take 120 sec by the expert	Take less than 10 sec	Reduce analysis time by 12 times
Accuracy of forecasting power demand	Variable errors depending on experts' proficiency	Within MAPE 7%	Human errors are resolved Improve reliability of forecasting data
Average monthly predicatable number of power demand	Provide temporary predictions only as required	Up to 1,880 cases Analysis available on 15 min/1 hour/a day	Increase efficiency ESS Charge/Discharge scheduling
Real-time power demand forecast	Not available	Available for forecasting real-time power demand	Increase efficiency operating ESS scheduling
Detection abnormal pattern of power usage And Peak management	Take up to 1 hour by the expert	Take less than 10 sec	Power Stabilization Reduce analysis time by 360 times
Scheduling of ESS charge and discharge	Fixed manual scheduling Not available for applying flexible power costs	Customized ESS scheduling based on power demand, cost and etc The most efficient power cost : 140 KRW/kwh	Increase flexibility of ESS scheduling Cut the cost up to 65%

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