LS ELECTRIC

LS E-House

FUTURING SMART ENERGY

CONTENTS

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FUTURING SMART ENERGY

E-House

is a Factory-assembled Steel Structured Substation equipped

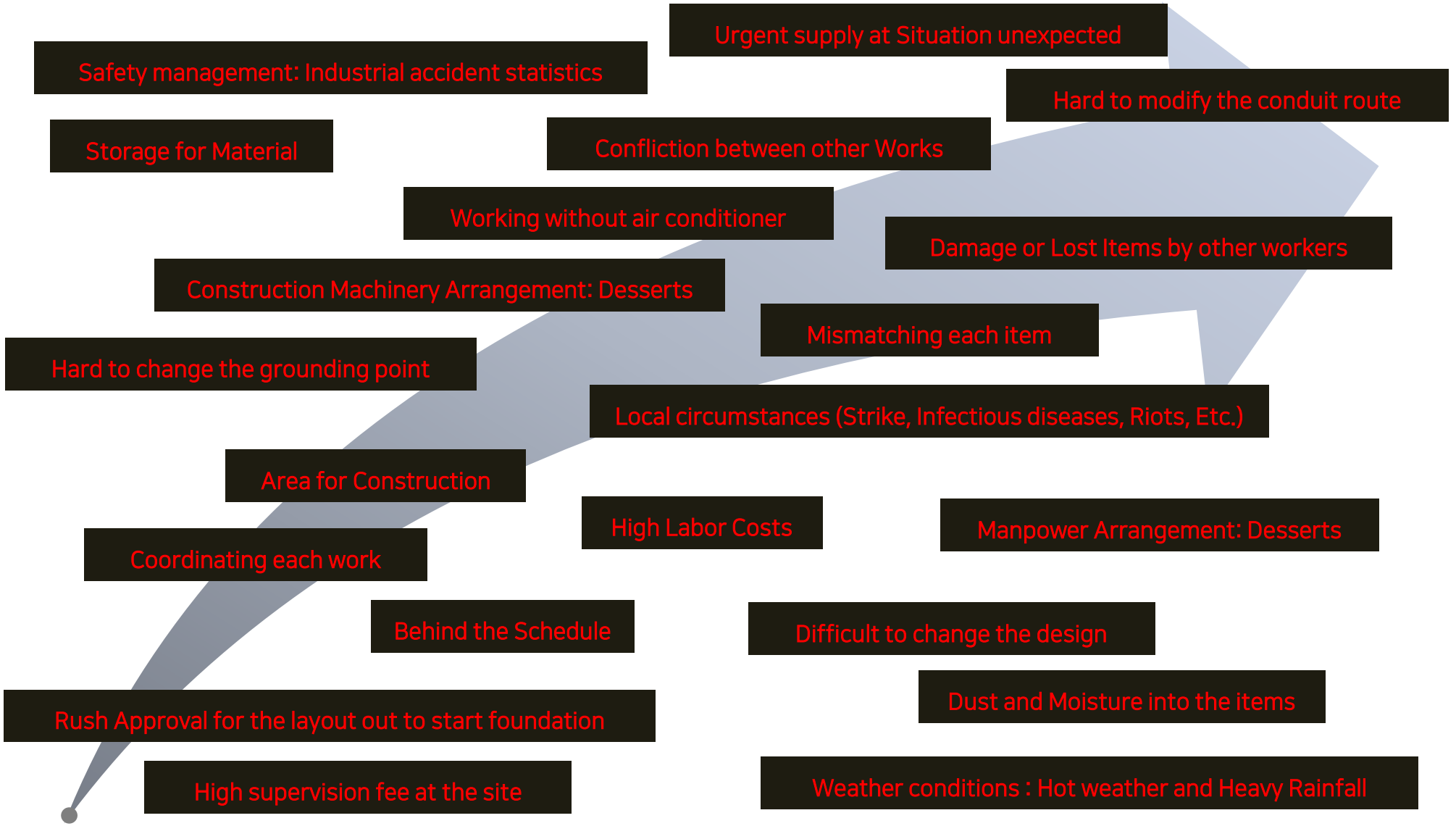
with SWGRs, TR, HVAC, Fi-Fi, and F&G System for minimizing construction at the site.

Concrete building electric room
(Stick Built type)

E-House
(Prefabricated type)

- HVAC : Heating, Ventilation, & Air Conditioning
- F&G System : Fire & Gas detection

Issues during the construction at the site



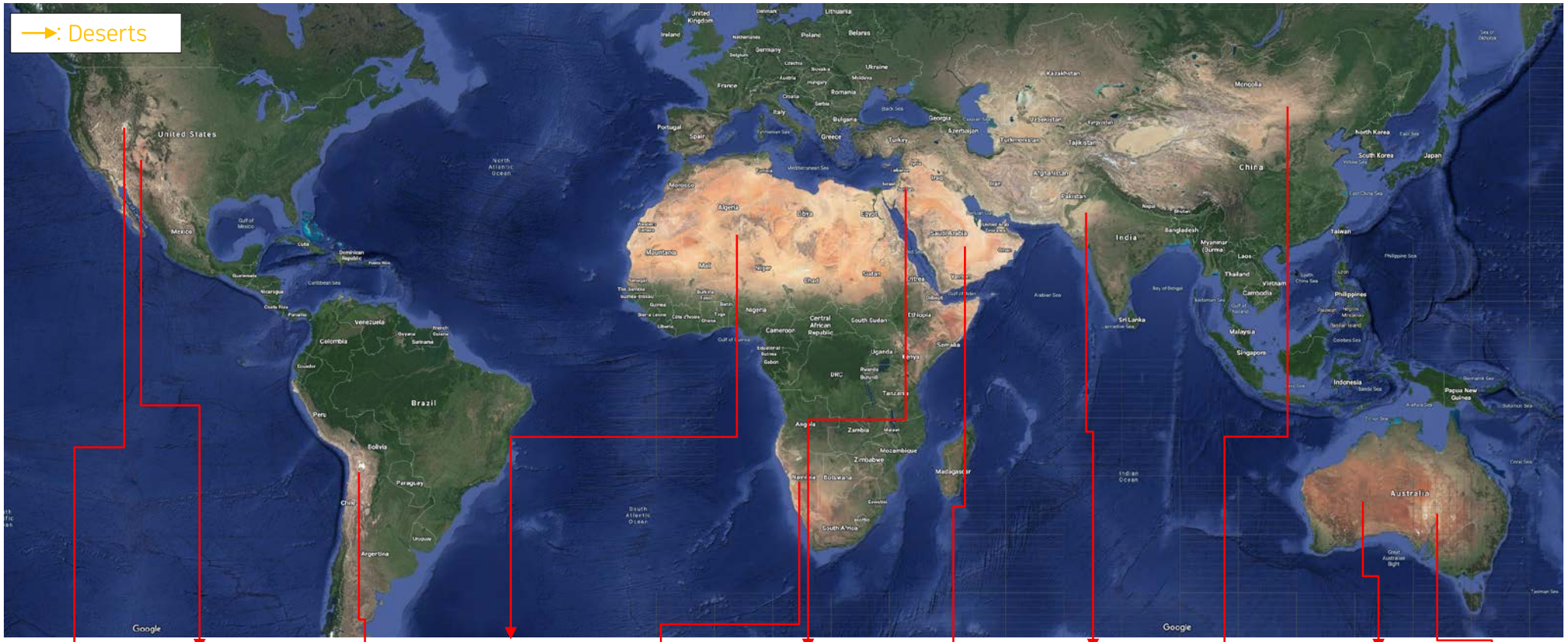
Industrial Accident Statistics

Based in Korea, Source : KOSHA

Index	A	B	C	D	E	F	G
Years	Number of Workers	Victims - Death - Injury	Accident Rate	Economic Loss [M USD]	Foregone Working Days[Days]	Loss per Victim(Person) Days (E/B)	Loss per Victim(Person) [k USD]
2012	15,548,423	92,256	0.59%	16,047	54,520,730	591	174
2013	15,499,228	91,824	0.59%	15,814	52,757,034	575	172
2014	17,062,308	90,909	0.53%	16,361	48,398,387	532	180
2015	17,689,931	90,129	0.51%	16,996	47,538,877	527	189
2016	18,431,716	90,656	0.49%	17,834	47,035,222	519	197
2017	18,560,142	89,848	0.48%	18,483	47,355,044	527	206
2018	19,073,438	102,305	0.54%	20,975	52,757,858	516	205
Average	**17,409,312** ≒ **17 M Workers**	**92,561** ≒ **93 k Victims**	**0.53%**	**17,501** ≒ **18 Billion**	**50,051,879** ≒ **50 M Days**	**541**	**189**

Desert in the World

Source : Google



Sonoran
USA

Mojave
USA

Atacama
Chile
Peru
Bolivia
Argentina

Sahara
Niger
Lybya
Mali
Morocco
Mauritania
Western Sahara
Sudan
Algeria
Chad
Tunisia
Egypt

Kalahari
Botswana
Namibia
South Africa

Syrian
Syria
Jordan
Iraq
Saudi Arabia

Arabian
Yemen
Oman
Jordan
Iraq

Thar
India
Parkistan

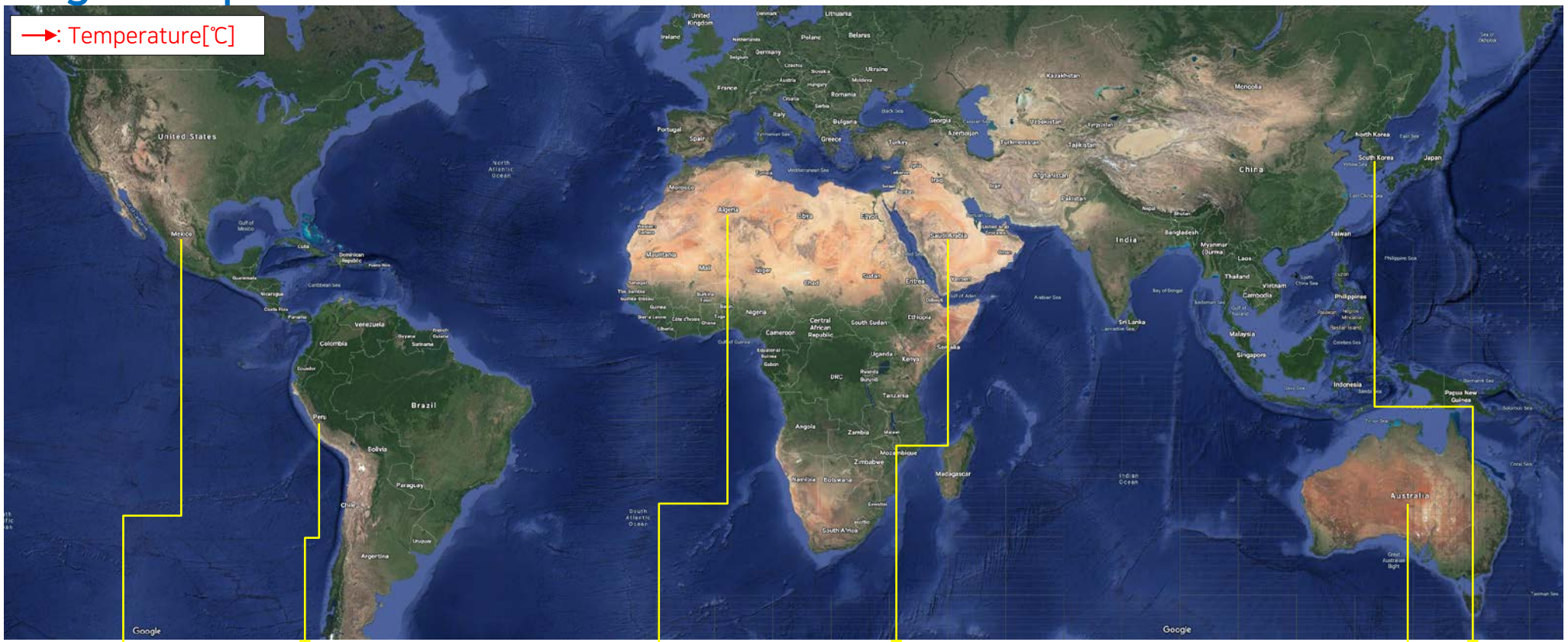
Gobi
Mongolia
China

Gibson
Australia

Simpson
Australia

High temperature in the world

Source : Korea Meteorological Administration, Google



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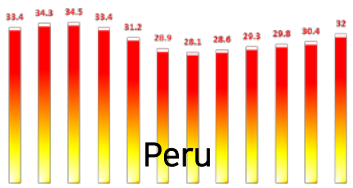

Peru

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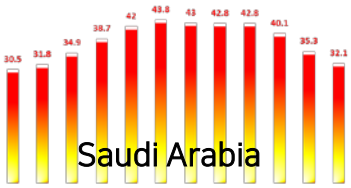

Saudi Arabia

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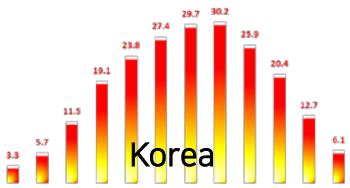

Korea

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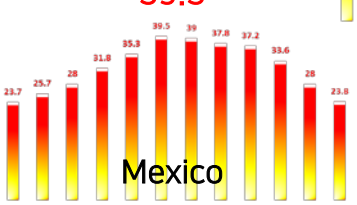

Mexico

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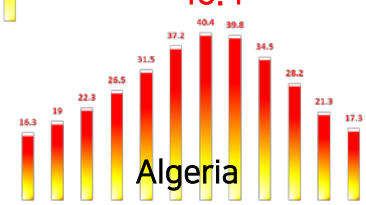
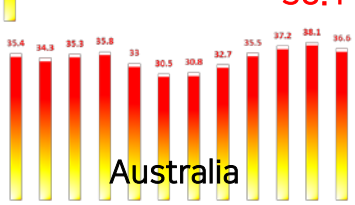


Algeria

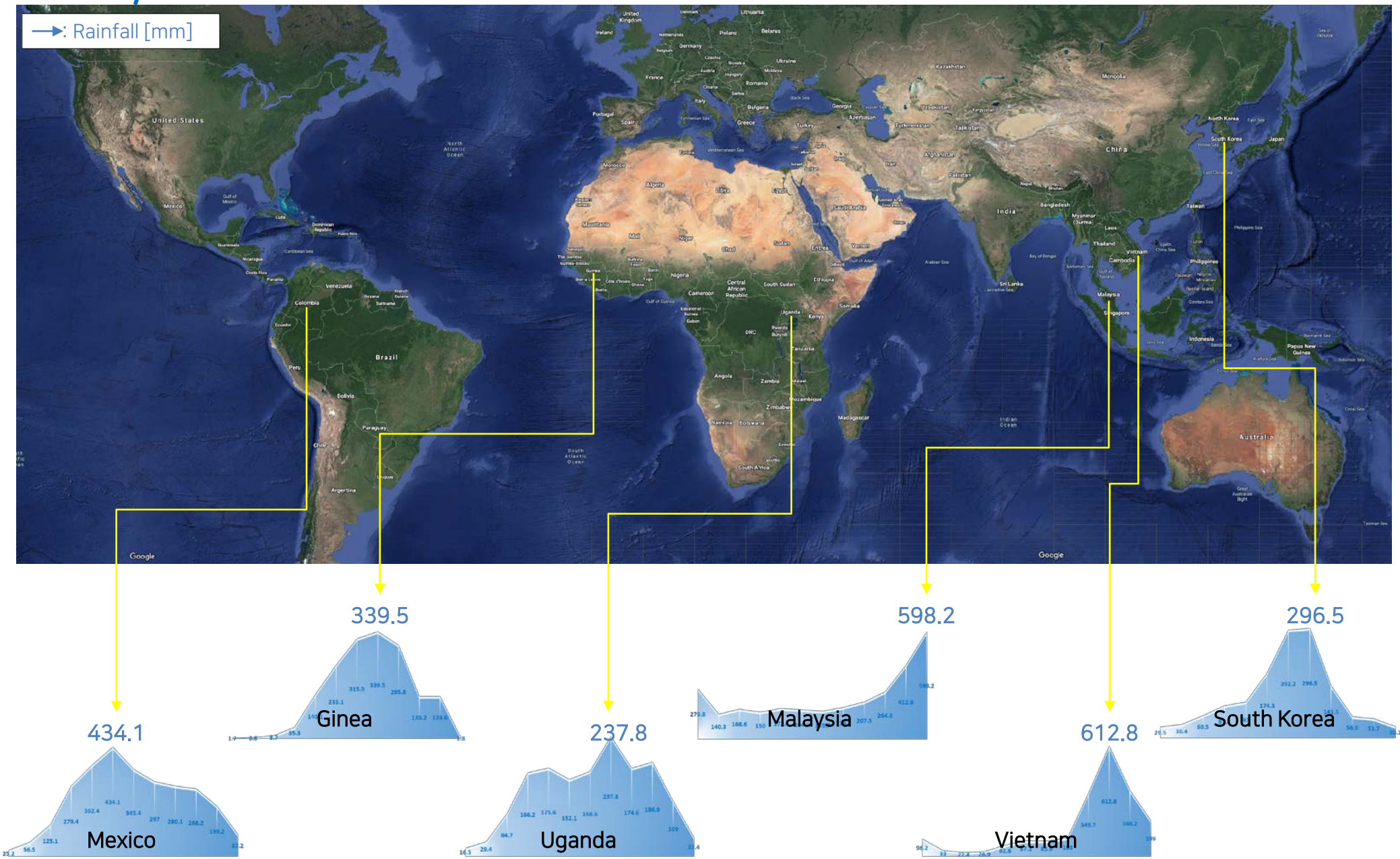
38.1



Australia

Heavy rainfall in the world

Source : Korea Meteorological Administration, Google



Safety and Reliability of Manufacturing in Advance (Minimized Site Work)

Manufactured in an optimal environment (personnel, lodging facilities, and equipment procurement)

Minimized risk of on-site installation (epidemic, weather, environment, labor strike, safety accident, etc.)

Rational test execution and follow-up:

- Reduction of supervisor's traveling cost
- Reduction of test equipment procuring cost
- Easier revision and rework

Flexible System Configuration and Modification/Expansion (One Stop Solution)

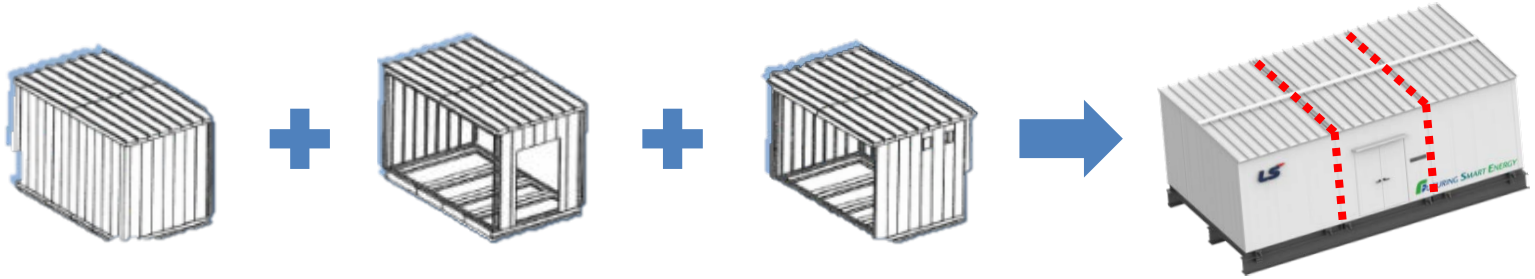
Configuration specific to the customer and environmental needs (System and Performance)

Quick and accurate equipment application for large-scale plant expansion

Ease of Transportation

Separation and assembly in units of vehicle transportation

Onshore, mobile, and simplified field application



Selection of the E-House Type in Consideration of Customer needs and the Installation Environment

Welding type E-House

Typical container manufacturing method (Welding the joints of each structure)

Strength	Weakness
- Rigid structure	- Relatively heavy
- Explosion-proof	- Tolerance needed
- Watertight	- Welding labor cost
- Securely sealed	- Increased delivery time

Interlocking type E-House

Assembled plate enclosure connected with bolts

Strength	Weakness
- Light structure if needed (Easy transportation)	- Non-explosion proof
- Parallel process	- Module manufacturing infrastructure needed
- Standardization requiring no tolerance	

Prefabricated walk-in type electrical House

Consists of all materials and systems required for conventional electric room


MV/LV SWGR


Transformer

E-House


HVAC


Fire Fighting System


SCADA


Busway System

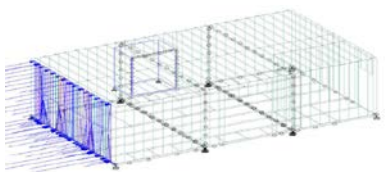

EMS


F&G System

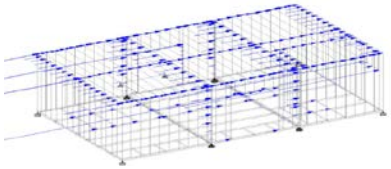
- SCADA : Supervisory Control & Data Acquisition
- EMS : Energy Management Systems
- HVAC : Heating, Ventilation, & Air Conditioning
- F&G System : Fire & Gas detection

Structural Design (Consideration for Load Condition)

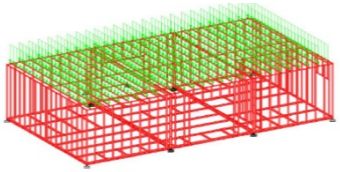
Design of structural deformation by external loads (earthquakes, wind, snow, equipment, and self-weight and explosion-induced pressure)



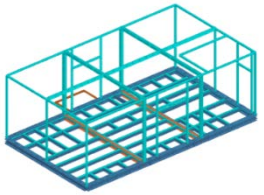
Wind Load

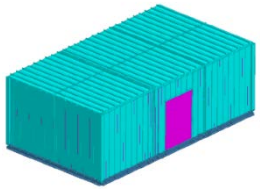


Seismic Load



Self-Weight

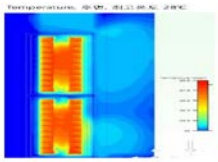


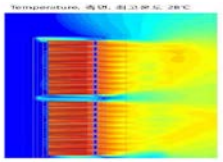


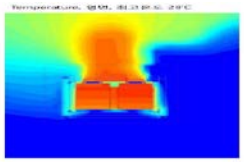
Air system Design (HVAC Cooling Load Calculation)

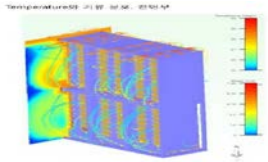
Analysis of heat flow by temperature difference and the temperature distribution, and change

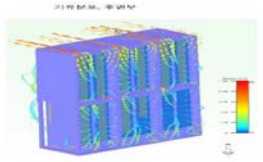
Analysis of properties, such as the velocity, temperature, and pressure, of liquid and gas





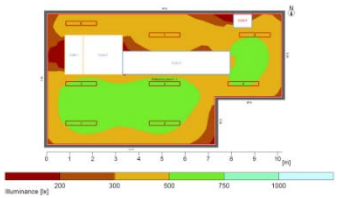


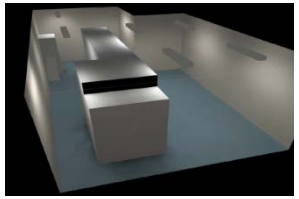




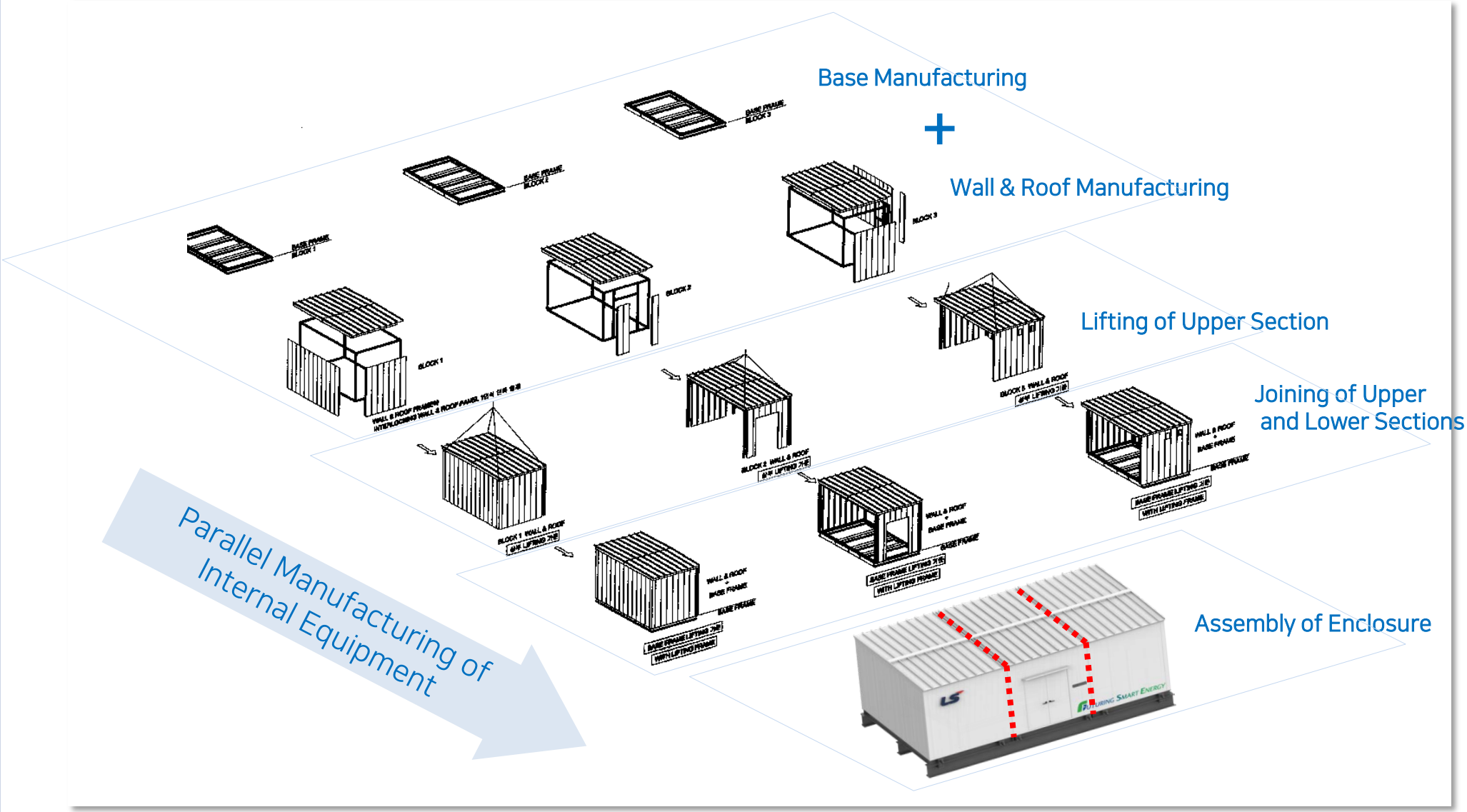
Interior Design (Elec., F&G, and Brightness)

Calculation of the brightness value to design the optimal brightness





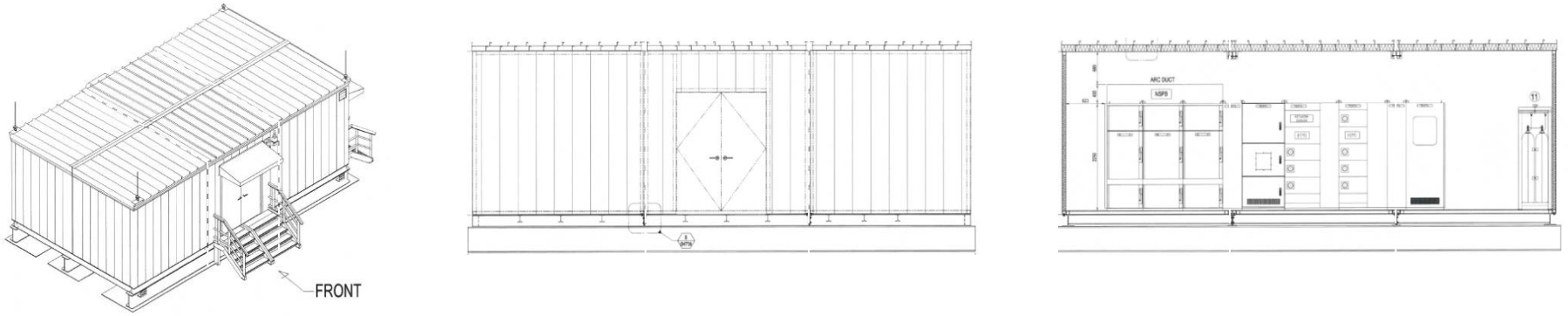
Fabrication



Joining of Upper and Lower Sections

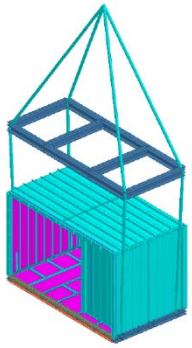
Module split

Considering the limitation of local transportation at site



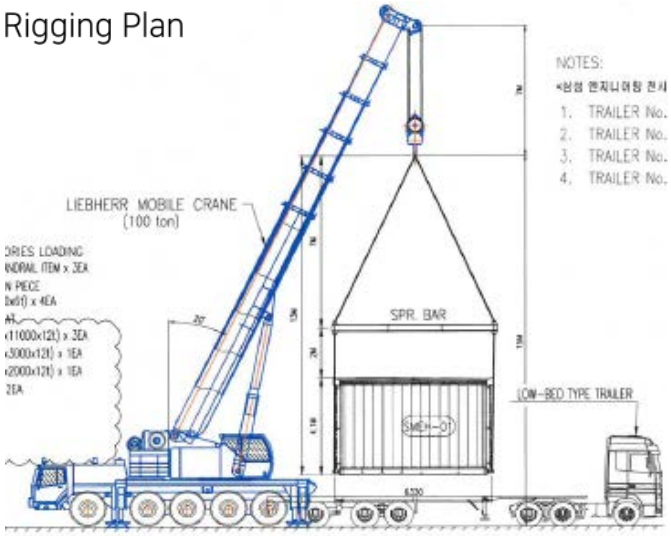
3-Module case

Loading and Unloading



Lifting Device

Rigging Plan

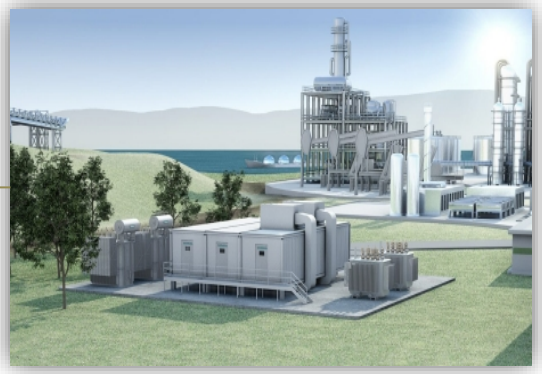


Docking at the site

Various applications such as large-scale industrial facilities and utilities

Oil & Gas plant
Mining facility

Outdoor Substation



Power plant

Mobile substation

Renewable energy facility

- Module type of transformers, switchgear, control distribution boards, and automated operating systems into container units.
- Various configurations, capacity, rapid installation, and cost reduction are possible.

Manufacturing & Test

Module unit Transport

Minimize installation & on-site testing

- ➢ Factory-finished systems that minimize on-site testing and ensure reliability after testing at the factory.
- ➢ Flexible systems in modular units respond to a variety of capacity/structure applications .
- ➢ Reliable systems that minimize various risks associated with construction and facilities from start-up to completion.

Optimized product for timely expansion of capacity and functions in modular units, considering the operational efficiency and economics of substations, and consists of eco-friendly products.

Modular

- Flexible configuration and structure according to operating environment of substation
- Short installation period due to post-test under the same conditions as the actual environment at the factory
- Fast, secure deployment based on Easy Connector between modules
- Economic response to changes in capacity and characteristics of substation and power systems.
- Diversification of layout structure according to site type

Green

- Eco-friendly substation by utilizing eco-friendly insulators
- vegetable oil transformer, SF_6 Free GIS etc.

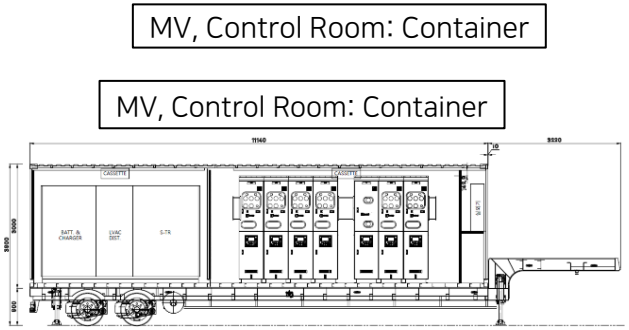
Substation

- Reduce overall cost of substation construction (labor, construction, infrastructure, risk, etc.)
- Strengthen O&M efficiency with automated operation system
- Easily utilize power quality stabilization facilities such as ESS and D-STATCOM

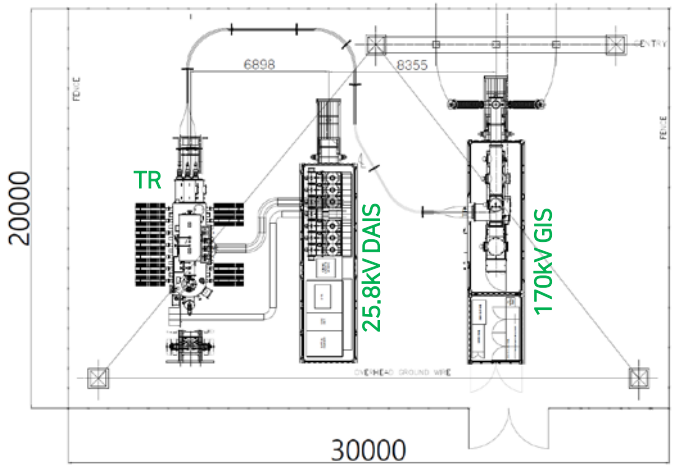
Available for renewable energy connections and temporary power supply. Building construction is not required and less restrictions on Floor Space.

- ✓ There is flexibility in layout if there is a cable connecting space between devices
- ✓ Container for switchboard and control room(No need for building)
- ✓ Foundation Grounding work required for substation foundation
- ✓ Base deployment size : 20mx30m

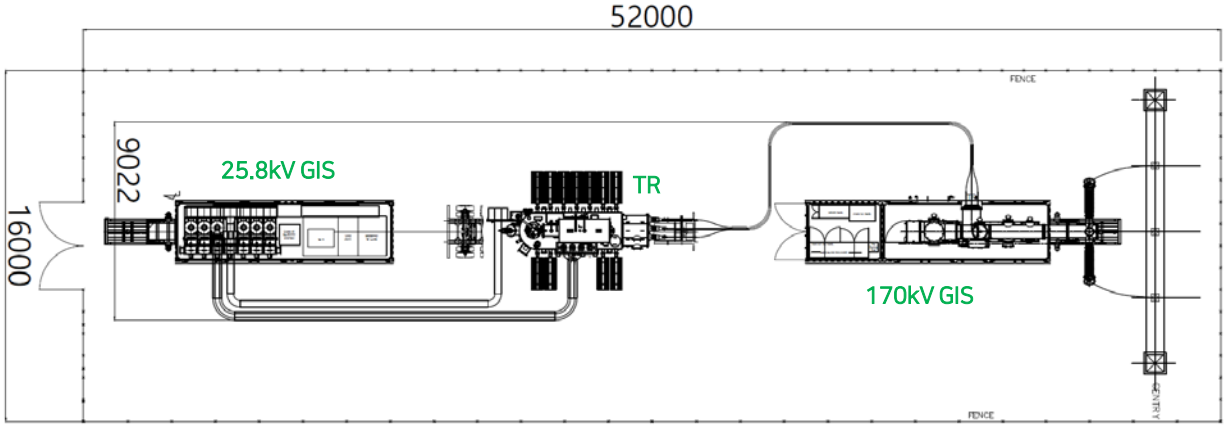
<Conventional Substation>



<Modular Substation>

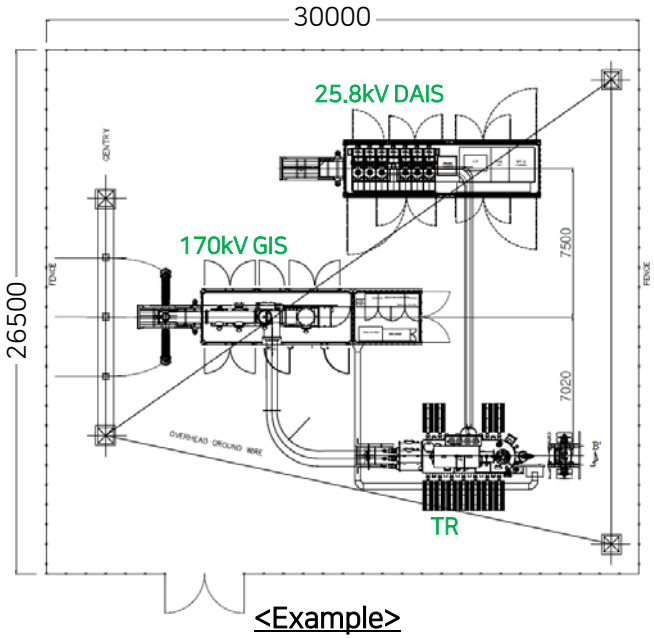


<Base deployment size(Minimum size)>



<Example>

※ Deployment and size may vary depending on your environment.



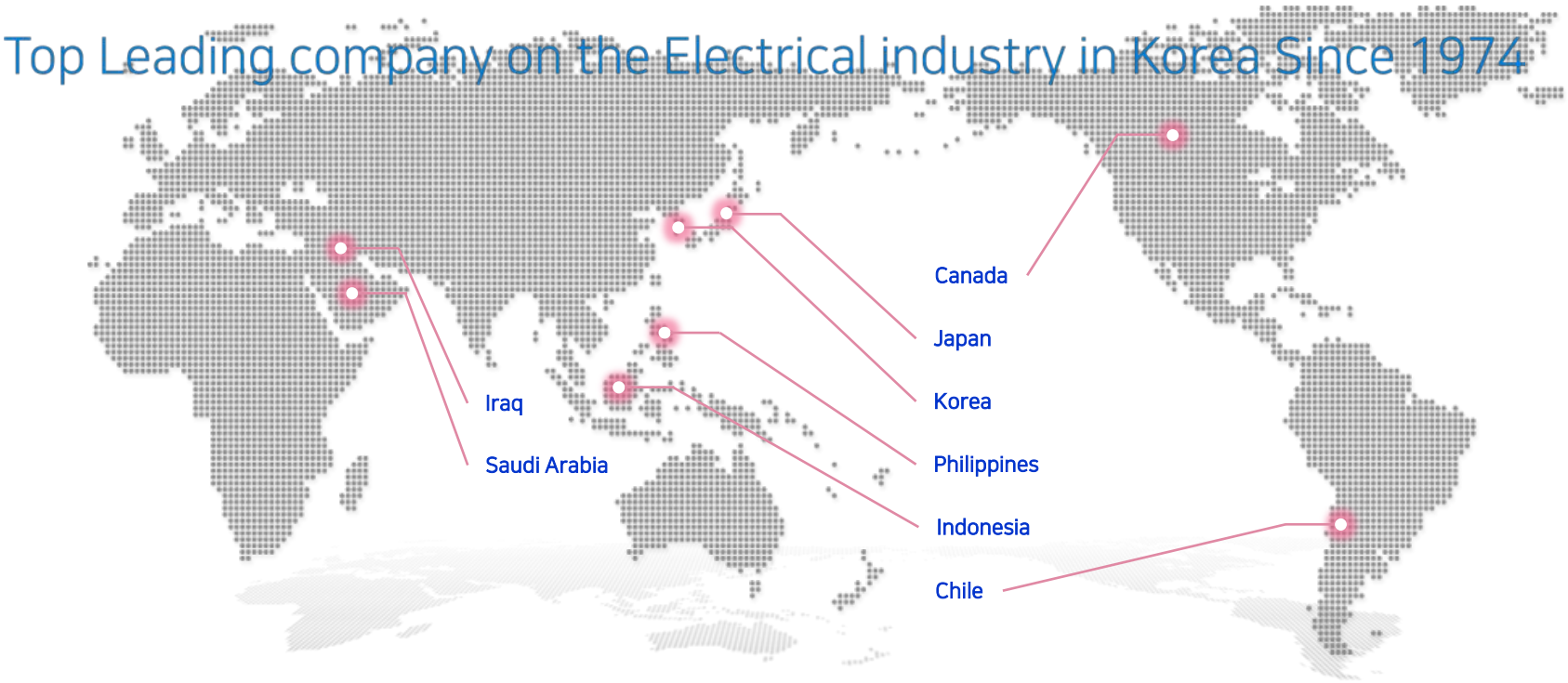
<Example>

Total Project Management

Experience of a wide range of power and E-House projects
Customer-centered one-stop service from engineering to installation and test operation
Strict quality and delivery management
Quick response to customer requests

E-House Sales Performance

22 E-house projects completed in 8 countries worldwide



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LS E-House 60seconds

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