

# Delta Infrastructure Solutions

The Leading Infrastructure Solutions  
Provider





# Overview

**Founded: 1971**

**World's Leader in Switching Power  
Supplies and DC Brushless Fans**

## Dedicated to Providing:

- Telecom Power Systems
- Industrial Automation
- Passive and Magnetic Components
- Networking Products
- Visual Displays
- Datacenter Infrastructure
- Renewable Energy and Energy Storage
- EV Charging Infrastructure

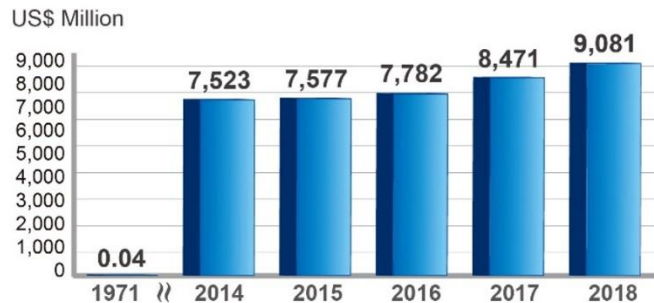


**Bruce Cheng**  
Founder and Honorary Chairman



**Yancey Hai**  
Chairman

## Worldwide Revenues





# Smart City

Focused Vertical Markets and Solutions

 Solutions

 Benefit


 Success case




 Energy & Utility

 Information & Telecom

 Building & Infrastructure

 Education

 Transportation & Logistics

 Manufacturing





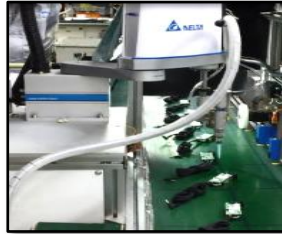
SCARA Movement  
Inspection



Teach Pendant  
Inspection



Conveyor Tracking &  
Glue Dispensing



Insertion



Assembly



Appearance Inspection



Screw Driving (SCARA & Articulated Robot)



PCB Soldering



Delta Confidential

# Smart Manufacturing Robot Workstations

## Customer Issues / Needs

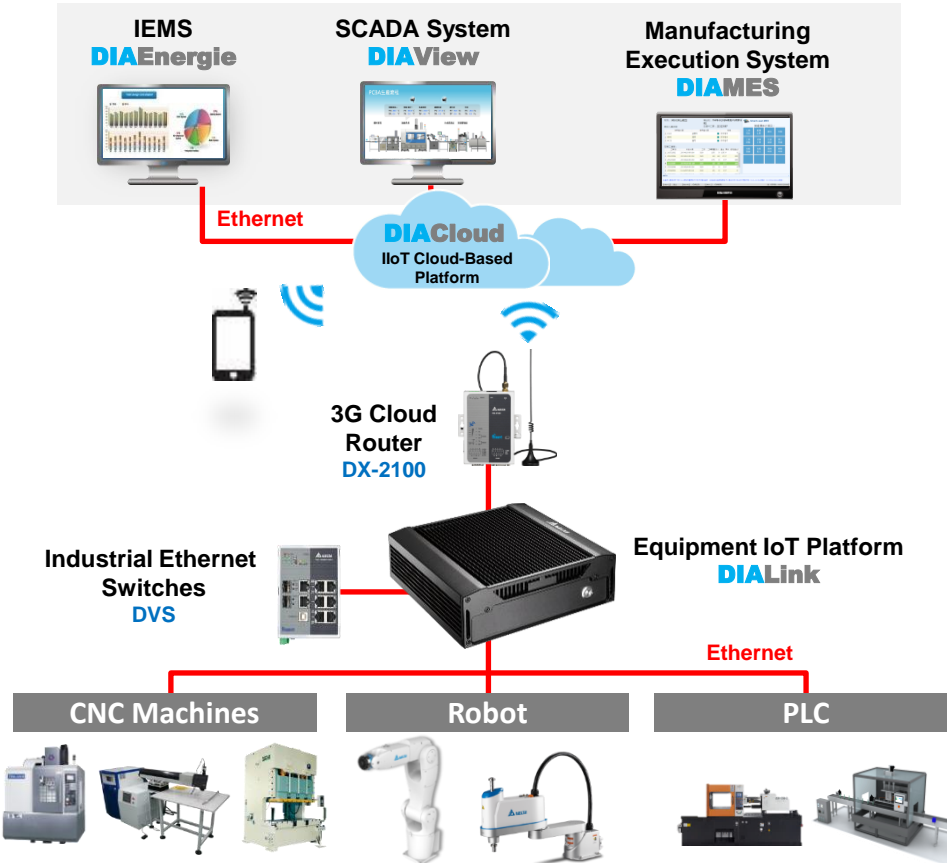
- Labor shortage and increasing labor / production costs
- Traditional manual operation limits productivity due to poor and inconsistent product quality
- Lack of flexible and inter-changeable production, and high production cost
- Flexible and inter-changeable production lines for short life cycles of commodities and customization / various customer demands

## Benefits

- Establishes automated robot workstations to solve labor shortage issue and increase productivity
- Enhances product yield rate and ensures consistent product quality
- Flexible manufacturing with inter-changeable production to shorten production time
- Integrated system with operation interface for parameter settings / operation records to save time for production line integration and change



# Smart Manufacturing Equipment IoT Solution (DIALink)



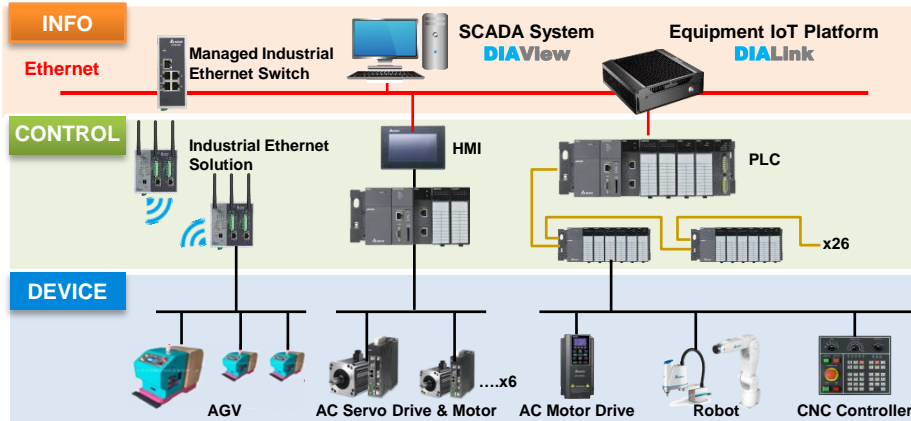
## Customer Issues / Needs

- Equipment data collection, management and visualization
- Utilization rate and equipment productivity analysis, as well as real-time operation monitoring
- Multi-plant monitoring on equipment operation and production information
- Overall Equipment Effectiveness analysis: utilization rate, working hours, and usage effectiveness in each processing section
- Equipment condition tracking and anomaly detection

## Benefits

- Transparent equipment information
- Customized real-time data visualization platform
- Production efficiency analysis by individual equipment
- Anomaly detection and idle time monitoring for efficient maintenance and operation

# Smart Manufacturing Production Line Integration

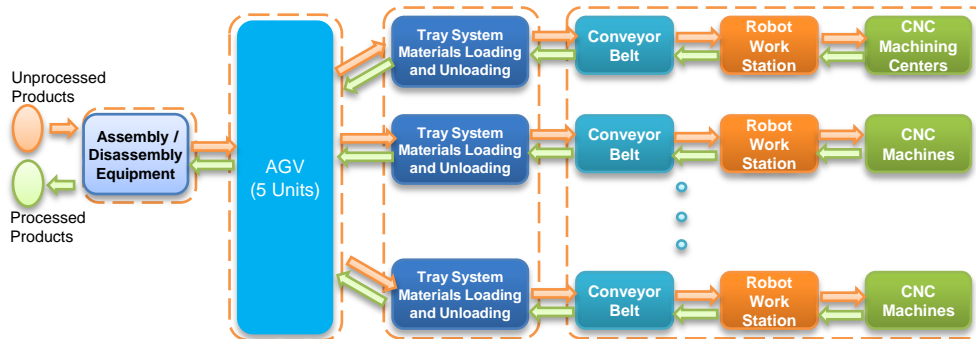


## Customer Issues / Needs

- Automated production on 7 production lines: requires PLCs as host control to incorporate robots, AGVs and other equipment
- Relies on labors for manual operation on CNC machines, resulting inconsistent productivity and product quality
- High employee turnover increases training costs and affects production efficiency and quality

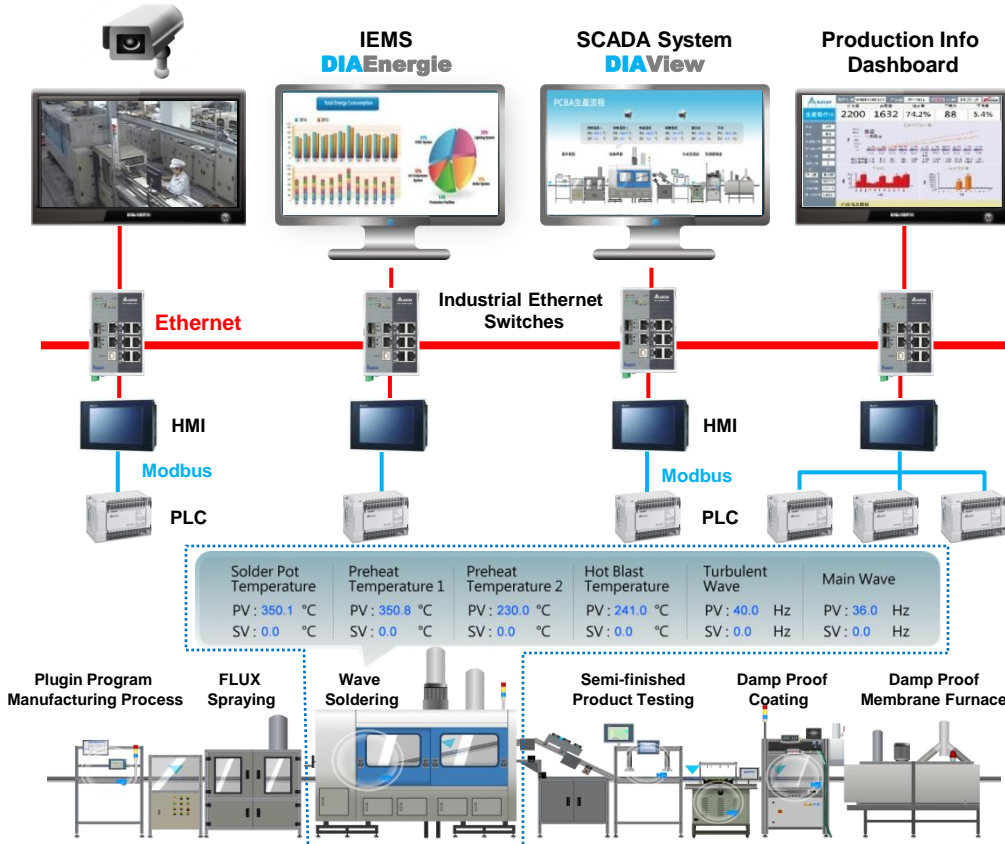
## Benefits

- Adopts Delta's AH500 Series PLCs as host controller for better production line / equipment integration, realizing advanced production automation
- Boosts operational efficiency and reduces processing downtime for improved productivity and product quality
- Saves up to **90%** manpower



\*AGV: Automated Guided Vehicle

# Smart Manufacturing Production Visualization



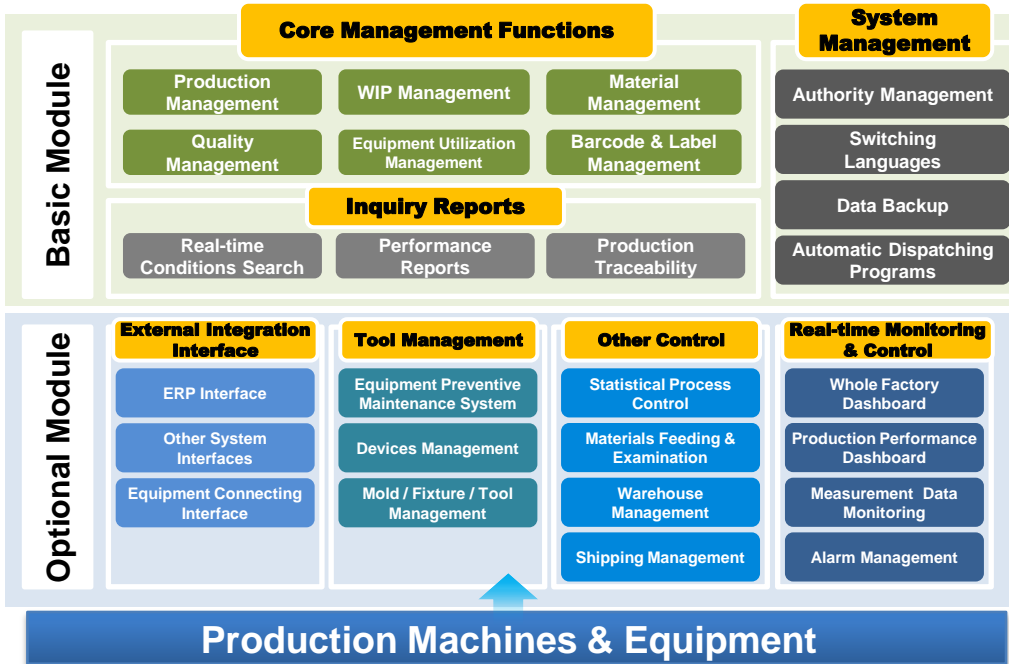
## Customer Issues / Needs

- Unable to trace production status, eliminate machine abnormality and reduce machine down time in real-time
- Unable to monitor real-time operation and enhance equipment efficiency
- Unable to trace production history and parameters
- Unable to acquire production status in closed system
- Unable to collect power usage data for effective energy performance

## Benefits

- Production visualization with real-time data collection, monitoring and analysis
- Transparent manufacturing information, immediate response and actions to enhance production quality and first pass rate
- Intelligent production control and scheduling to increase overall efficiency
- Complete production history to analyze abnormal events and ensure quality control for management

# Smart Manufacturing Manufacturing Execution System (MES)



## Customer Issues / Needs

- Needs for real-time manufacturing information, traceability and high production reliability
- Manual operation leads to human errors and inefficient management
- Slow response to production and quality issues, hard to identify root causes
- Poor production scheduling and performance

## Benefits

- Transparent manufacturing information, complete and real-time production traceability, and high communication and management efficiency
- Integrated system and automated management to enhance production efficiency and quality
- Complete production traceability assists production / material tracking and customer service
- Lower material/product inventory with enhanced on-time delivery rate
- Better customer trust and satisfaction





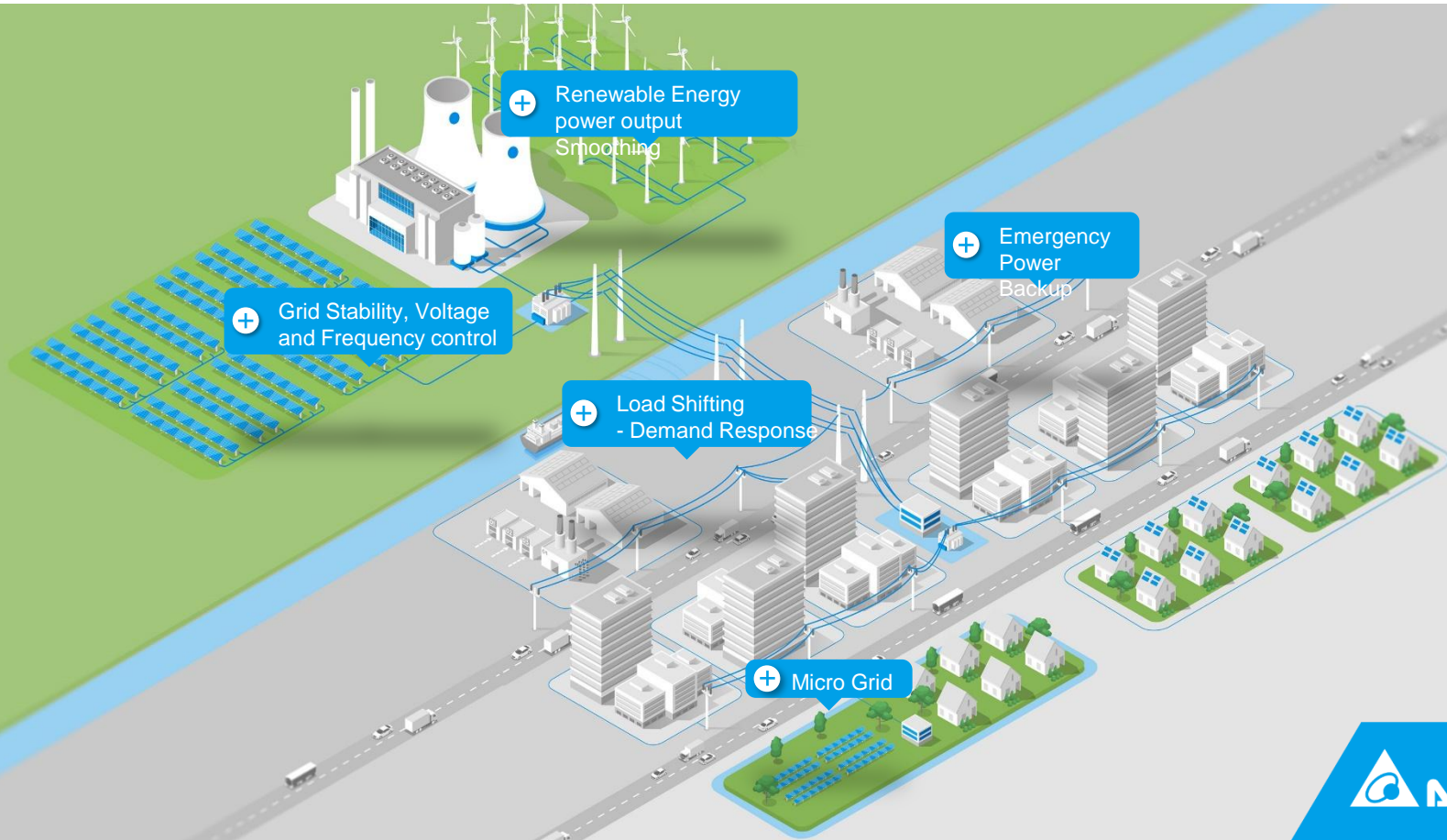


# Energy & Utility

Solutions

Benefit

Success case





# Energy & Utility

Solutions

Benefit

Success case



## Management Energy Management Solutions

**Delta Cloud System**

**ENERGY** HISTORY SETTING

INFORMATION: PLANT DATA COLLECTOR INVERTER

20°C 18.5° 11.3°  
Sunrise 05:27 Sunset 18:37

DATE: 2018 4 9

DAILY MONTH YEAR 20 YEARS

Production: 0.001 kW

Production graph showing energy production over time (02:00 to 22:00).

**Output**

ID	Voltage	Current	Power
1	222.2 / 224.6 / 225.1 V	23.07 / 23.23 / 23.25 A	4962 / 5047 / 5079 W
2	223.6 / 223.5 / 226.1 V	23.77 / 23.63 / 23.7 A	5143 / 5122 / 5190 W
3	229.6 / 228.6 / 228 V	21.42 / 21.33 / 21.38 A	4758 / 4718 / 4724 W
4	227.5 / 225.5 / 227 V	22.74 / 22.74 / 22.72 A	5008 / 4959 / 5003 W
5	228.8 / 226.8 / 226.9 V	20.98 / 21.04 / 21.03 A	4641 / 4615 / 4626 W
6	230.6 / 229.5 / 231.2 V	23.01 / 23.01 / 22.93 A	5148 / 5111 / 5132 W
7	224.3 / 223.7 / 224 V	22.85 / 22.86 / 22.98 A	4963 / 4940 / 4998 W
9	224.5 / 223.4 / 223.9 V	22.68 / 22.65 / 22.55 A	4929 / 4896 / 4895 W
10	222.5 / 222.1 / 222.7 V	20.74 / 20.82 / 20.84 A	4468 / 4466 / 4491 W
11	0 / 0 / 0 V	0 / 0 / 0 A	0 / 0 / 0 W
12	0 / 0 / 0 V	0 / 0 / 0 A	0 / 0 / 0 W
13	0 / 0 / 0 V	0 / 0 / 0 A	0 / 0 / 0 W

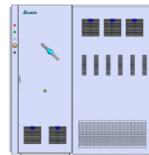
## Ethernet TCP, Modbus RTU, CANBus Based Communication

Power & Utility



PV inverters

Mega Watt PCS



MW PCS

BESS



BESS

EV Charging



CPO Back Office



EV Chargers





Energy & Utility

# Renewable Energy Power output

## Smoothing



# Success Case

 Solutions

 Benefit

 Success case

## Japan - Ako Solar Farm

- PV System: 4.6 MWp (commissioned in 2015)
- PV System with ESS: 500 kW
- Power Conversion System: 500 kW
- Li-Ion Battery Energy Storage: 362 kWh
- Smooth PV output by ESS to reduce the grid impact. Ensure PV output by 1% variation/min of system maximum capacity





Energy & Utility

# Emergency Power Backup

 Solutions

 Benefit

 Success case



## Success Case

### Fukushima Plant Factory

- Plant factory grows Orchid usually takes 2 to 3 years before harvesting. The environment condition need to be carefully maintained in green house to keep the plant growth stably.
- PV installed to provide standalone power source and integrate with ESS to keep the growing system operation when grid power disconnected.

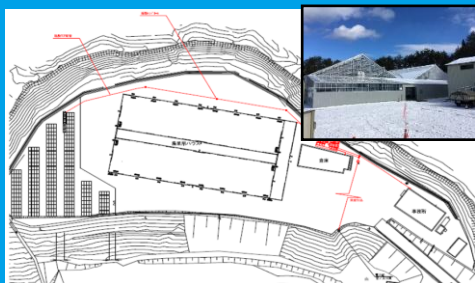
#### Requirement

- Keep the environment control 30-60 minutes after power outage
- Store excessive power from PV

#### Delta's Solution:

- 125kW PCS
- 120kWh battery in 3 cabinets

**Commissioning:** Nov., 2017



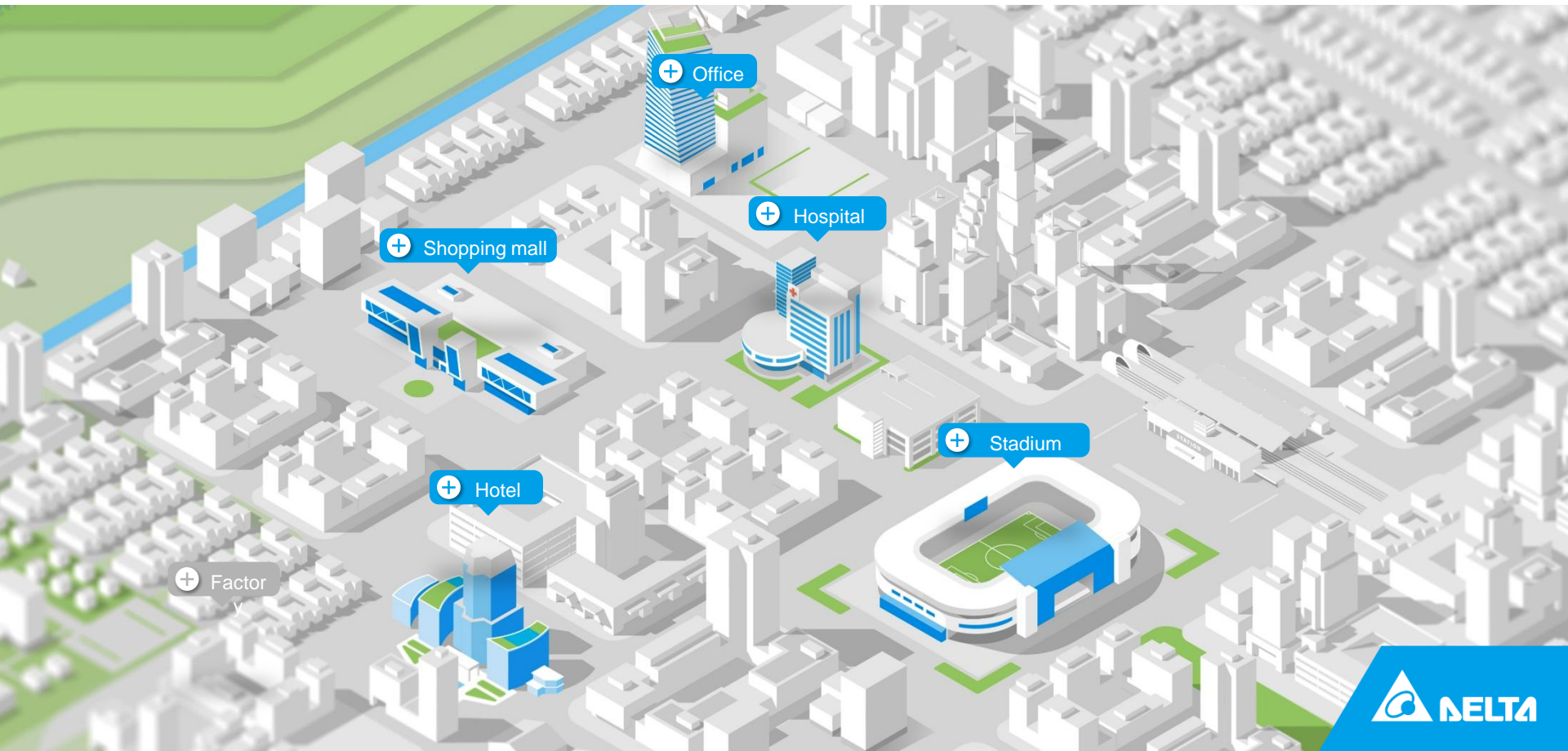


# Building & Infrastructure

 Solutions

 Benefit

 Success case





# Building & Infrastructure

Solutions

Benefit

Success case



Management

## Building Management Solutions



L-Web Building Management System



Delta Energy On Line global platform

Control

## Loytec Building automation Control Devices



System

## IP Based Communication

HVAC & Lighting

Security

Power & Utility

EV Charging

PCS+ESS



AHU



Heat pump

LED lighting + Intelligent Sensor + DALI controller



VAST 2



Security Camera Solution & LPR



PV inverters



Black Office



EV Chargers

Site controller



PCS and BESS



Building & Infrastructure

# Office Building

 Solutions

 Benefit

 Success case



## Success Case

# Netherlands – Delta EMEA HQ

- Renovation and upgrade of existing building into modern working environment
- Green building - achieving up to 45 percent energy savings
- highly effective, cost-efficient, eco-friendly management of entire building
- High-efficiency LED lighting products, smart sensors, actuators & LOYTEC's DALI lighting system integrated

**Location:** Hoofddorp, The Netherlands

**Delta's Solution:** 50kW PV system, 125kW PCS and 50kWh battery for P/Q control and peak-shaving.

**Commissioning:** Mar 2017





Building & Infrastructure

# Shopping Mall

 Solutions

 Benefit

 Success case



## Success Case

- 137,000 square meters, 115 shops, 20 restaurants, 10 movie theaters, Jumbo hypermarket on 41,200 square meters on three floors, car park for 2,600 cars.
- Integral solution includes:
- Control (smoke extraction system, hot and cold water, ventilation system, lighting, climate control)
- Monitoring (transportation, power distribution, doors, pumping water systems)

Premium shopping mall with 800,000 square feet shopping areas, a state-of-the-art 5 screens multiplex. Area for offices and hotel will add up to 400,000 sq ft.

### **BMS Solution:**

Monitoring and controlling of chiller plants, AHUs (air handling units), CSUs (ceiling-suspended units) over BACnet. Monitoring and controlling ventilation and plumbing system. Lighting control over KNX, energy meters, diesel generators and fire alarm integration over Modbus, BTU meters over M-BUS.







Building & Infrastructure

# Shopping Mall

 Solutions

 Benefit

 Success case



## Success Case

- Germany shopping center incorporates an eco-friendly 2.2 MW commercial rooftop PV system
- The inverters' high level of efficiency of up to 98.6 percent is important for maximum energy yield

### Shopping Center, Germany



- Delta's Fast EV Charging and Battery Energy Storage Solutions Support Greenway's EV Stations in Bratislava

- **Solution:** Ultra Fast EV Charging, Battery Energy Storage System ( BESS), Delta Efficient Energy Management Solutions (DEEMS), Power Conversion System ( PCS)

### Shopping Center, Slovakia



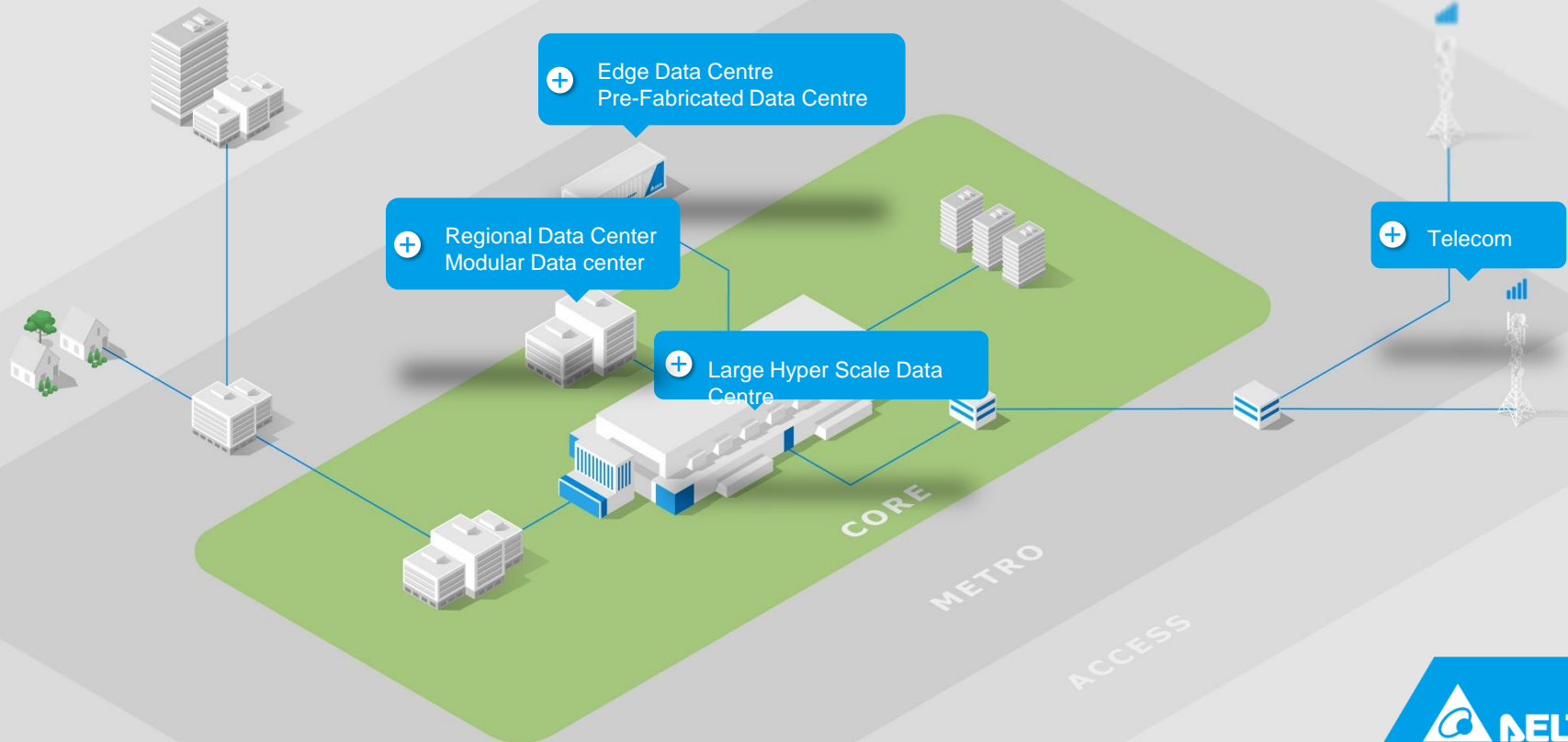


# Information & Telecom

Solutions

Benefit

Success case



NEXT



# Information & Telecom / Data Centre

Solutions

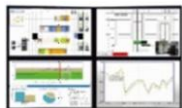
Benefit

Success case



Management

## Data Centre Infrastructure Management



Control

## IP based Connectivity & Environment Monitoring



System

## IP Based Communication

Infra-suite Device Master

### HVAC & Lighting



Precision Cooling



LED lighting + Intelligent Sensor + DALI controller

### Security



VAST 2



Security Surveillance



Display Solution

### Power & Utility



Battery (Li-on) & cabinet



Eltek CPS



HVDC Solution



UPS Power Protection



EV Chargers

### IT Equipment



ATS/PDU



Infrasuite Solution



OCP Rack and Power






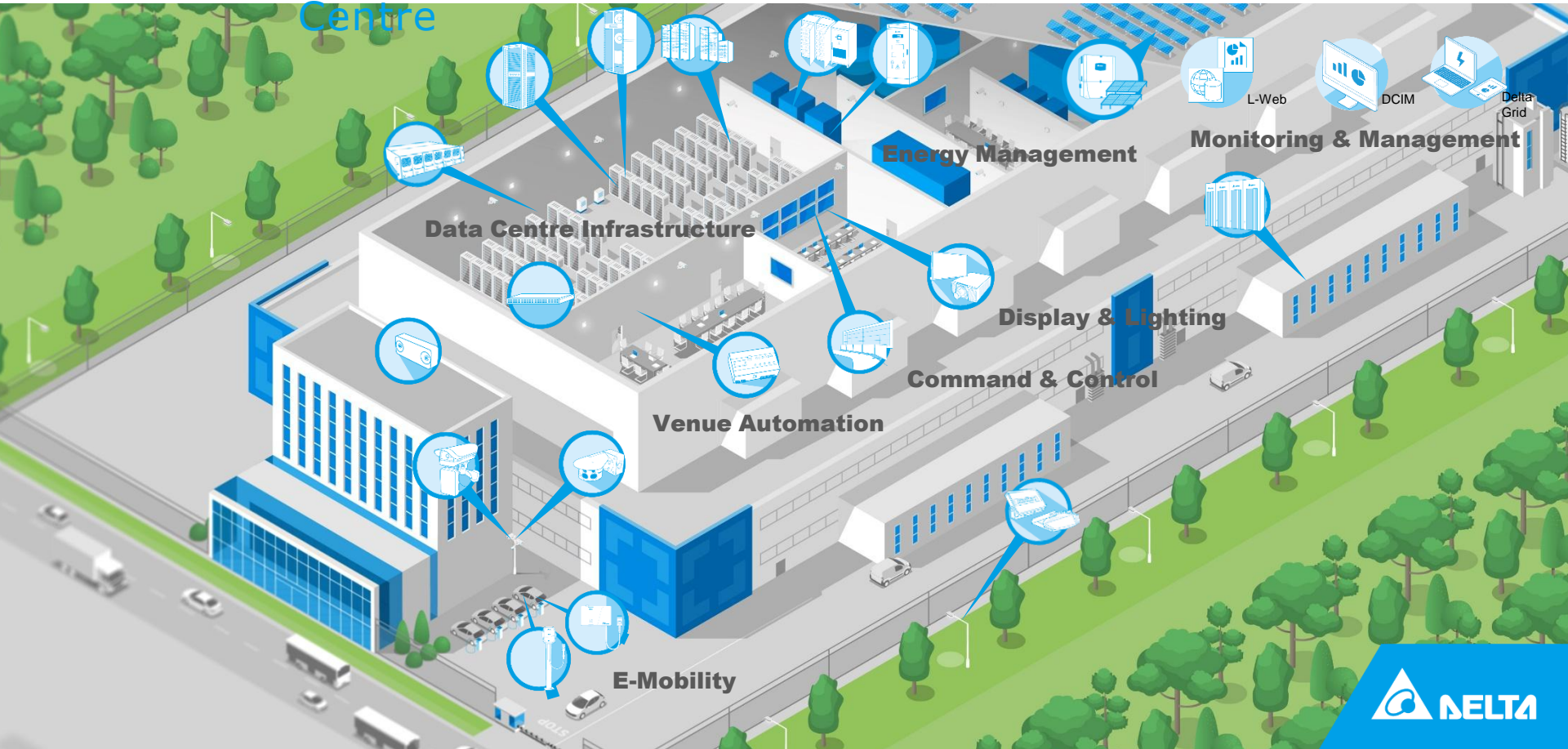
Information & Telecom

# Large Hyper Scale Data Centre

 Solutions

 Benefit

 Success case





## Cold / Hot Aisle Containment

- Avoids cold and hot air mixture for PUE optimization together with RowCool and free cooling solutions

## Power Distribution System



- PDU: Modular and hot-swappable output breakers
- rPDU: Reliable branch circuit breaker protection

## InfraSuite Manager (DCIM)



- Inbuilt DCIM solution that fully integrates environment monitoring, IP camera, door access, motion sensor, fire suppression and more.



**Adaptable to all aisle width requirements ranging from 600mm to 1200mm.**

## Modular UPS



- Fully modular design. Hot-scalable and hot-swappable.
- Ultra-integrated system with power supply, power distribution and runtime.
- Leading power efficiency up to 96.5%

## RowCool



- Highly-efficient variable fan speed control saves 27% of power if fan speed reduce by 10%

## Rack



- High perforation rate > 70%
- Reliable high density design supports 1420kg static weight

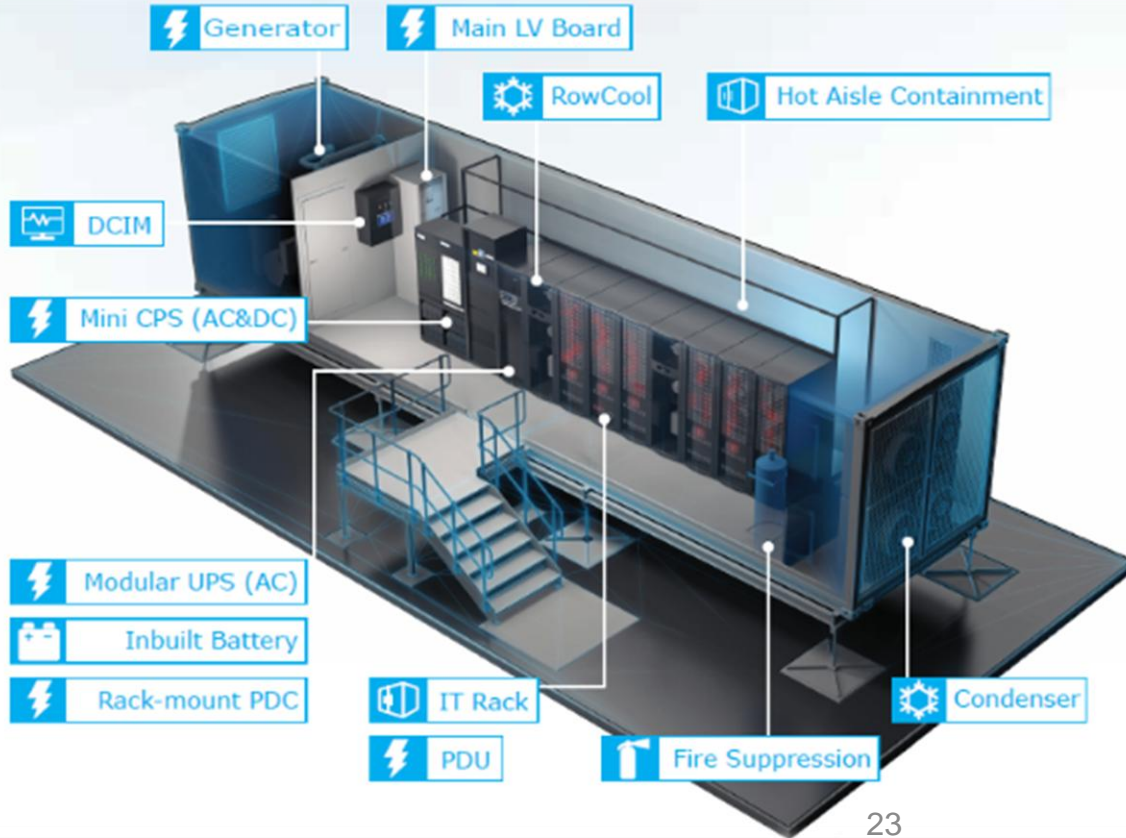


# **DELTA All-in-one Containerized Data Center Solutions**

Quick deployment for edge computing in the IoT world



# All-in-one CDC



*UPS & Power Management*



*Precision Cooling*



*Server Rack*



*DCIM*



*Fire Suppression*



Information & Telecom

# Large Hyper Scale Data

## Centre

# Success Case



 Solutions

 Benefit

 Success case

- Delta Provides Open Compute Project Power and Rack solution in Facebook datacenter and other major Hyper scale datacenters globally.
- Solution Offer:
  - 12V and 48V open rack and Power
  - AC, DC PDU
  - Remote Monitoring System
  - Li-Ion Battery Back Up Solution

**Delta Provides** HVDC solution for Baidu ( the biggest Chinese Search Engine) new Datacenter in ChangZhou.

**Solution Offer:**

- AC distribution and DC distribution Cabinet
- HVDC System Cabinet and PDU
- AC to HVDC Rectifier Module
- HVDC to 48V/12V converter module



Sweden - Facebook Lulea Data Center



China - Baidu HVDC Datacenter





# Smarter. Greener. Together.

To learn more about Delta Thailand, please visit  
[www.deltathailand.com](http://www.deltathailand.com).

