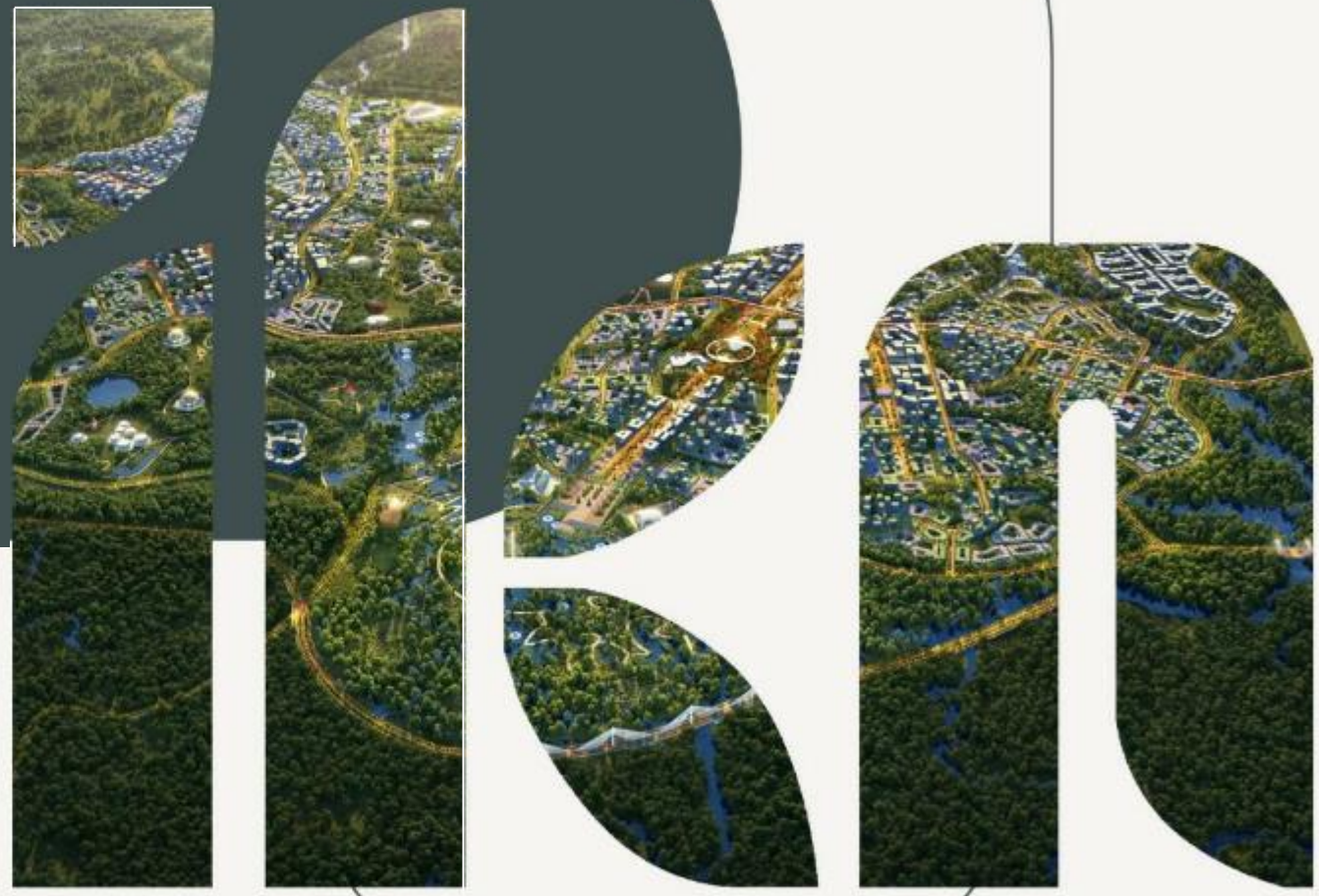
NUSANTARA

Smart Pole Nusantara Tech Landscape 2024 - 2025



Deputy for Green and Digital Transformation, Nusantara Capital City Authority

Smart City Investment Package
Nusantara Capital City Authority

Market Briefing, March 2024

Investment Package 2024 - 2030

1 ICCC

2 CCTV

3 INTEGRATED PAYMENT SYSTEM

21 DATA CENTER

PHARMACY CENTER

SEMICONDUCTOR CENTER

SMART BUILDING

20 SMART POLE

SMART PARKING

22 UAV

AUTONOMOUS VEHICLE

4 EV CHARGING

INVESTMENT CATEGORY

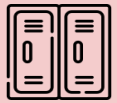
- ACCESS & DATA HUB
- LIVING & WELL-BEING
- BUILDING & INDUSTRY
- ENERGY & ENVIRONMENT
- TRANSPORTATION

13 SMART LIVING

14 SMART CULTURE

15 TECHNO HOUSE

6 SMART LOCKER



8 SMART DISPLAY

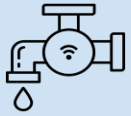
7 SMART HEALTH

5 SMART ENERGY

24 SMART GRID

9 SMART WASTE

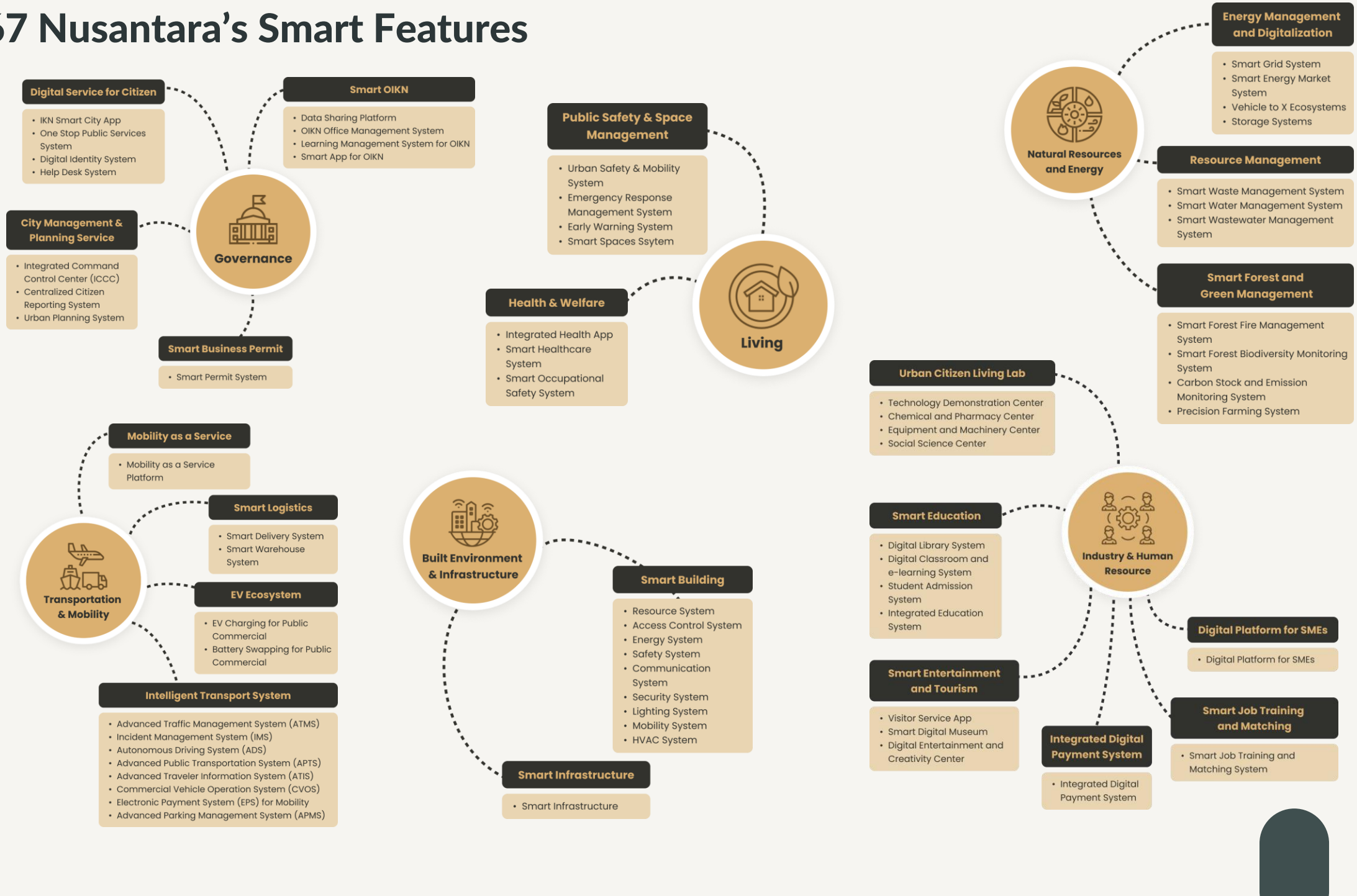
10 SMART WATER



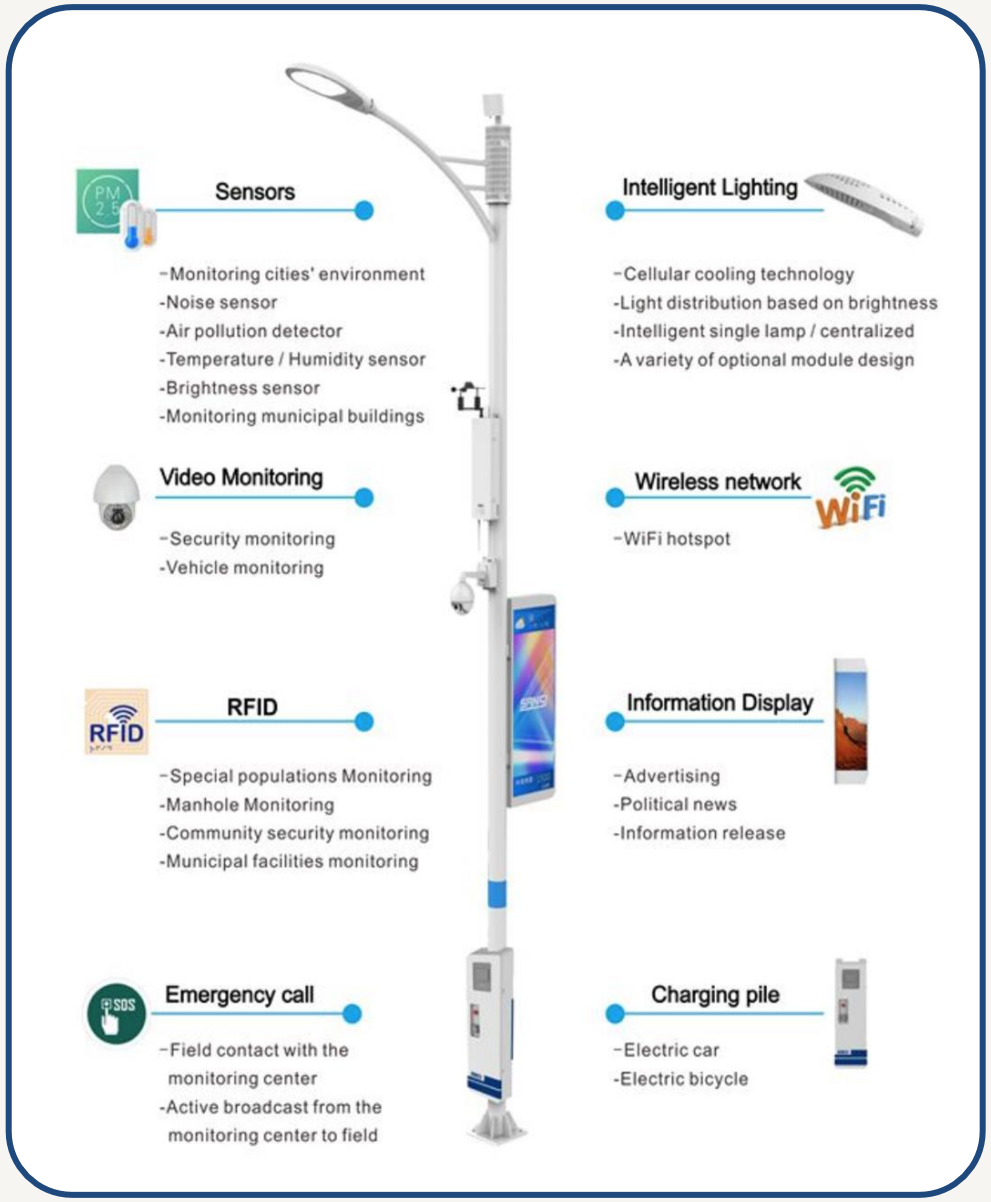
11 SMART FOREST

12 SMART ENVIRONMENT

67 Nusantara's Smart Features



About Smart Pole as Smart City IoT Hub



Summary
Smart Pole is a smart city infrastructure that aims to adopt a sustainable approach in city resource management of Nusantara. By combining advanced technologies, cities can not only achieve the goal of effective lighting but also contribute to sustainable development and smarter, safer city living for all IKN citizen.

Function
Provide sufficient lighting in public spaces while optimizing energy consumption. This system is designed to minimize energy waste by ensuring lights are only used as needed.

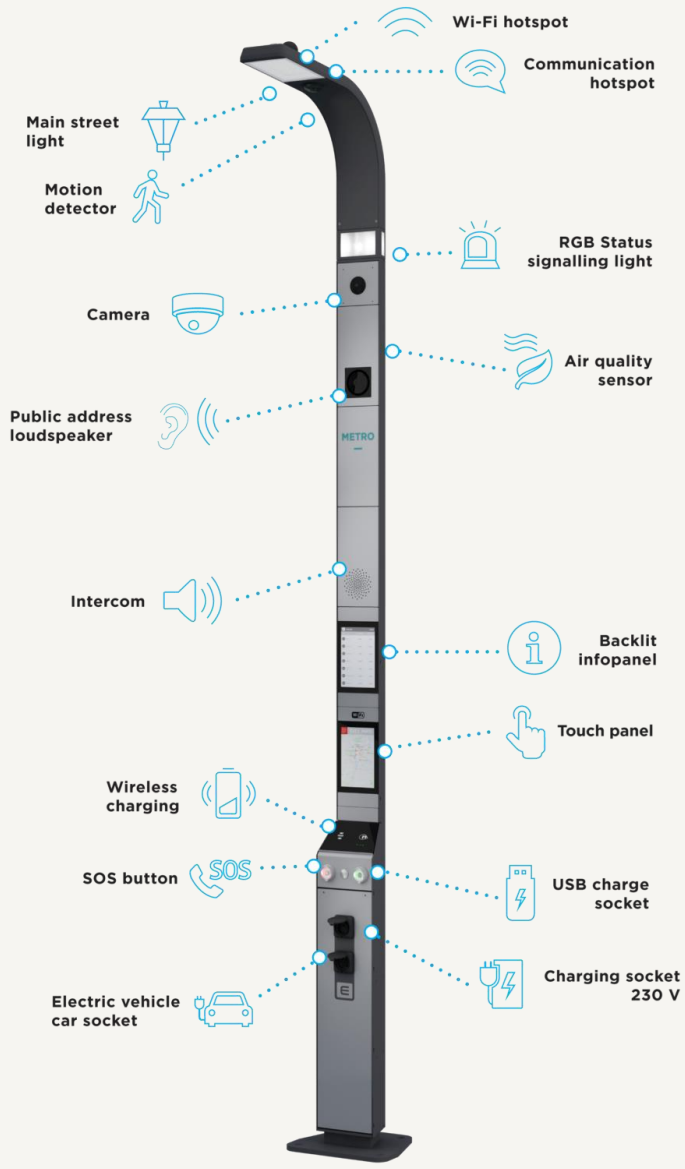
Unit targets
311

Installation Area
8 prime areas

Use Cases for Smart City

Smart Pole General Specifications (All Use Cases)

Component	Minimum Specifications	Description
LED lights	- Power: 30-60 Watts - Lumens Efficiency: ≥ 100 lm/W - Color Range: 3000K-6500K - Lamp Life: ≥ 50,000 hours	Energy-saving LED lamps with efficient light output and long life.
Light Sensor	- Type: Photodiode - Sensitivity Range: 1-1000 lux	Sensor to detect environmental light levels, allowing automatic adjustment of lamp light intensity.
Motion sensor	- Type: PIR or Microwave - Range: 5-15 meters - Detection Angle: Minimum 90 degrees	Sensors that detect motion to activate or adjust lighting based on the presence of people or vehicles.
Smart Pole Controller	- Compatible with Zigbee, LoRa, or NB-IoT - Support for remote control and time programming	Devices for controlling and monitoring lamp functions, including timing and response to sensors.
Connectivity	- Protocol: Wi-Fi, Ethernet, 4G/LTE - Keamanan: Enkripsi WPA3, VPN	Connectivity for data communications and remote management, with strong data security.
Management system	- Web-based interface - Real-time data visualization - Automatic reporting and notification features	Software for management, monitoring and performance analysis of smart lighting systems.
Power Supply	- Power over Ethernet (PoE) or Solar System - Battery Backup	Efficient and reliable power source, with battery backup option for uninterrupted operation.
Cabinet Control	- Weather resistant - Security lock system - Passive ventilation and cooling	Cabinet to protect electronic components from weather and physical security.
Cyber Security	- End-to-end data encryption - Firewall and IDS - Multi-factor authentication	Protection against cyber threats and unauthorized access to smart pole systems.
Air Quality Sensor	- Detection: PM2.5, CO2, NO2 - Accuracy: ±10% - Operational range: -20°C to +50°C	Sensors to monitor air quality around smart poles, providing data for environmental initiatives.
CCTV	- Resolution: Minimum 1080p - Frame Rate: 30 fps - Viewing Angle: Minimum 90 degrees - Storage: Cloud and/or local storage of at least 256 GB - Weather Resistance: IP66 or higher	CCTV cameras with high resolution and adequate frame rates for clear and smooth surveillance. Weatherproof design ensures operation in a wide range of environmental conditions.



IoT Layers of Smart Pole

Business Layer

- Connected to Application Layer
- Develop Strategies and Policies
- Involves Big Data Analytics

Applications Layer

- Utilize data processed by the Middleware layer
- Provide solutions and services to users

Middleware Layer

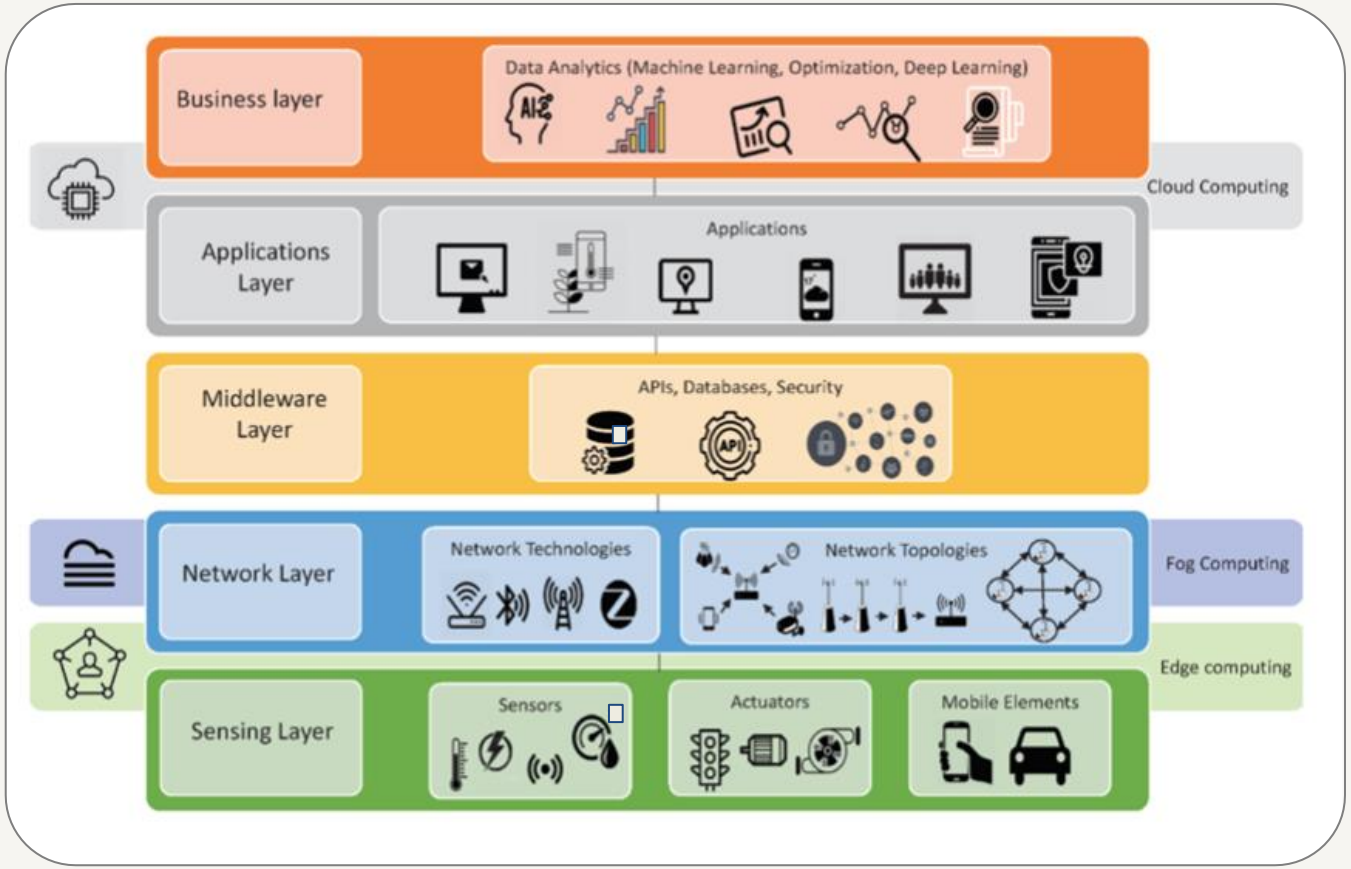
- Standardize communication between hardware and software
- Provides a common interface to the Sensing Layer and Application Layer hardware

Network Layer

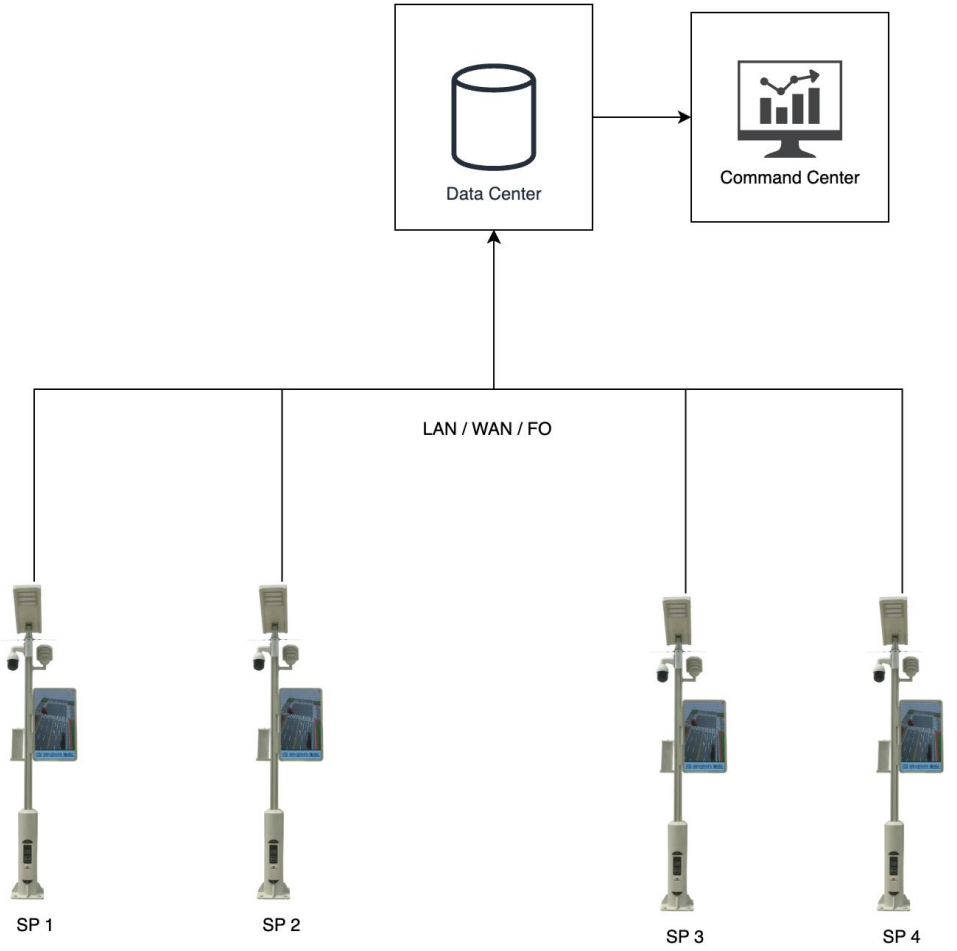
- Ensuring reliable data transmission between IoT devices and servers or data centers
- Includes fog computing

Sensing Layer

- Consists of sensors
- Obtain information about physical quantities of interest in any application as well as actuators that can act on physical objects



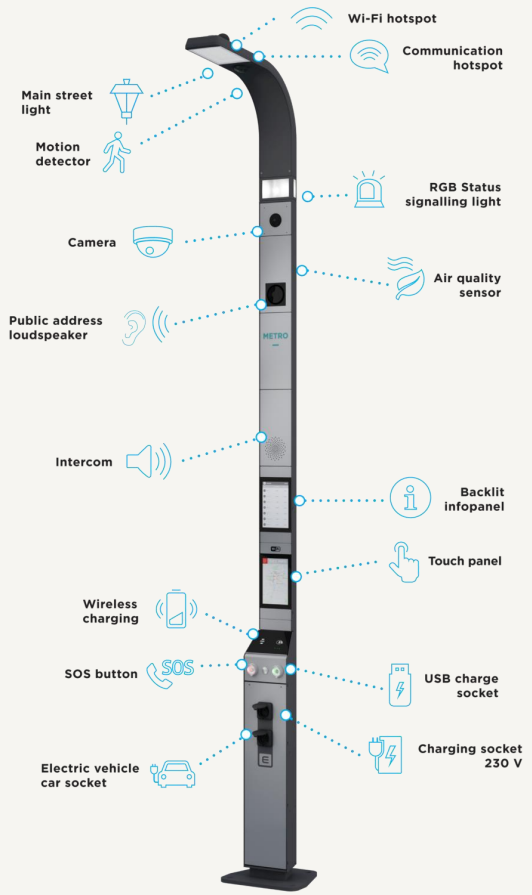
Topology & Implementation



Nama Item	Item per Implementasi	Jumlah titik Implementasi	Total
Smart Pole			
Solar Panel 400 Watt	1	311	311
Electric Grid	1		311
CCTV	1		311
Interactive Display	1		311
LAN/WLAN/FO Connection	1		311
Data Controller	1		311
LED Lamp 300 Watt	1		311
Tiang Besi 4 - 7 Meter	1		311
Ethernet 4MBps per CCTV	1		311

Klasifikasi Jalan	Tinggi Tiang (meter)
Bebas hambatan	9 – 13
Arteri	9 – 13
Kolektor	7 – 9
Lokal	≤ 7
Lingkungan	≤ 5

Use Cases 1 : Street Lighting



Placement Criterias:

- Public roads
- Pedestrian Areas
- Parking Spaces

Component	Minimum Specifications	Description
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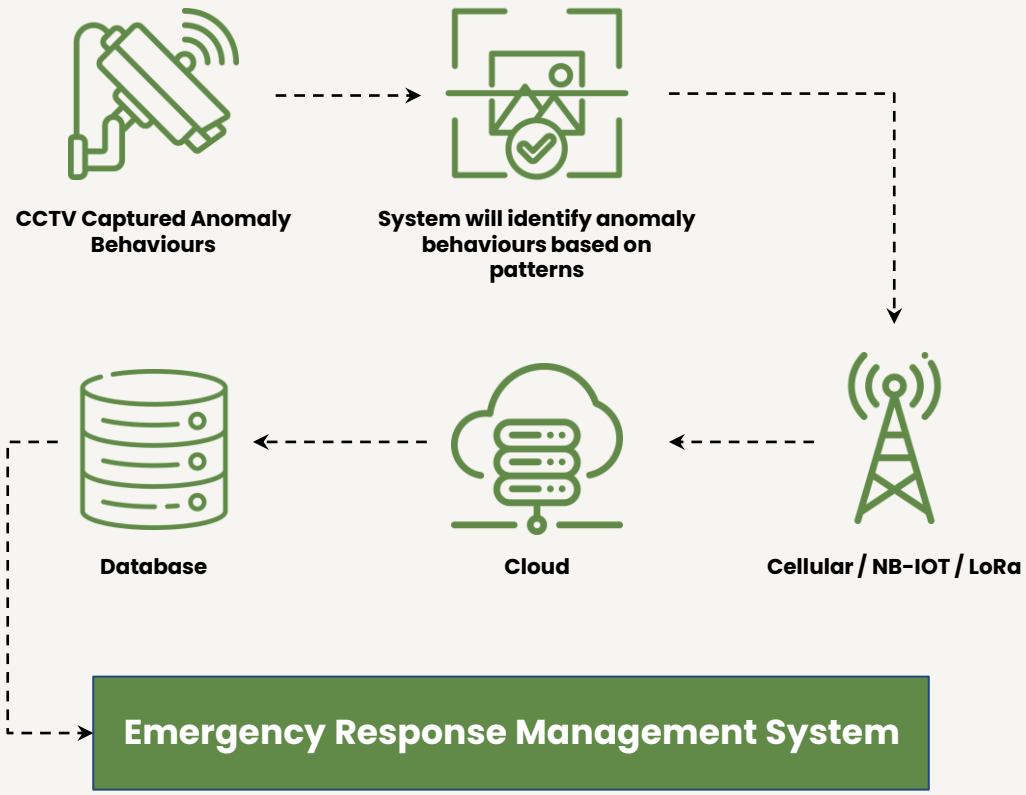
Connectivity	- Protocol: Wi-Fi, Ethernet, 4G/LTE - Keamanan: Enkripsi WPA3, VPN	Connectivity for data communications and remote management, with strong data security.
Management system	- Web-based interface - Real-time data visualization - Automatic reporting and notification features	Software for management, monitoring and performance analysis of smart lighting systems.
Power Supply	- Power over Ethernet (PoE) or Solar System - Battery Backup	Efficient and reliable power source, with battery backup option for uninterrupted operation.
Cabinet Control	- Weather resistant - Security lock system - Passive ventilation and cooling	Cabinet to protect electronic components from weather and physical security.
Cyber Security	- End-to-end data encryption - Firewall and IDS - Multi-factor authentication	Protection against cyber threats and unauthorized access to smart pole systems.
Air Quality Sensor	- Detection: PM2.5, CO2, NO2 - Accuracy: ±10% - Operational range: -20°C to +50°C	Sensors to monitor air quality around smart poles, providing data for environmental initiatives.
CCTV	- Resolution: Minimum 1080p - Frame Rate: 30 fps - Viewing Angle: Minimum 90 degrees - Storage: Cloud and/or local storage of at least 256 GB - Weather Resistance: IP66 or higher	CCTV cameras with high resolution and adequate frame rates for clear and smooth surveillance. Weatherproof design ensures operation in a wide range of environmental conditions.

Use Case 2 : Security CCTV

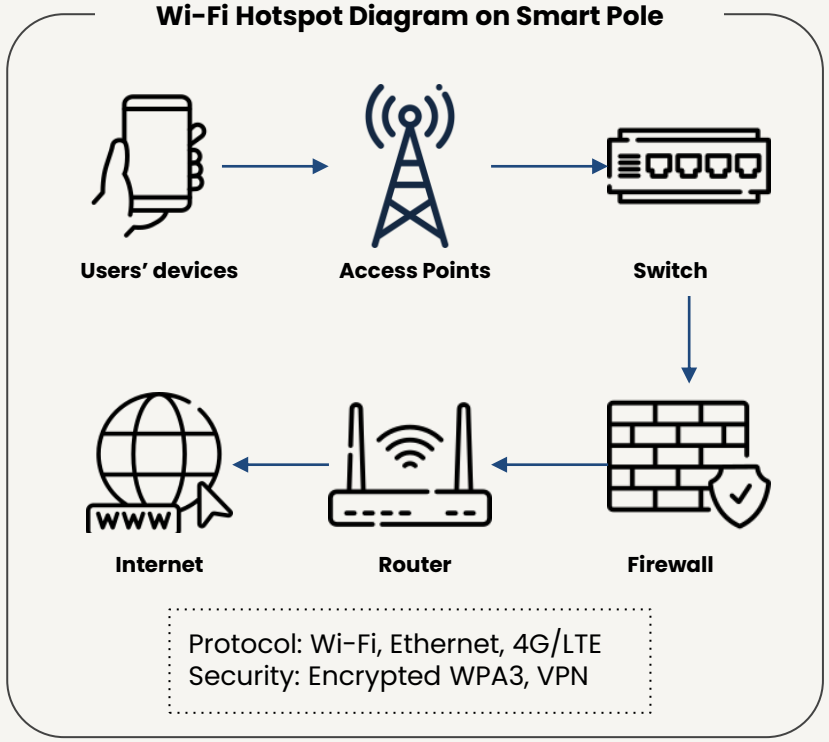


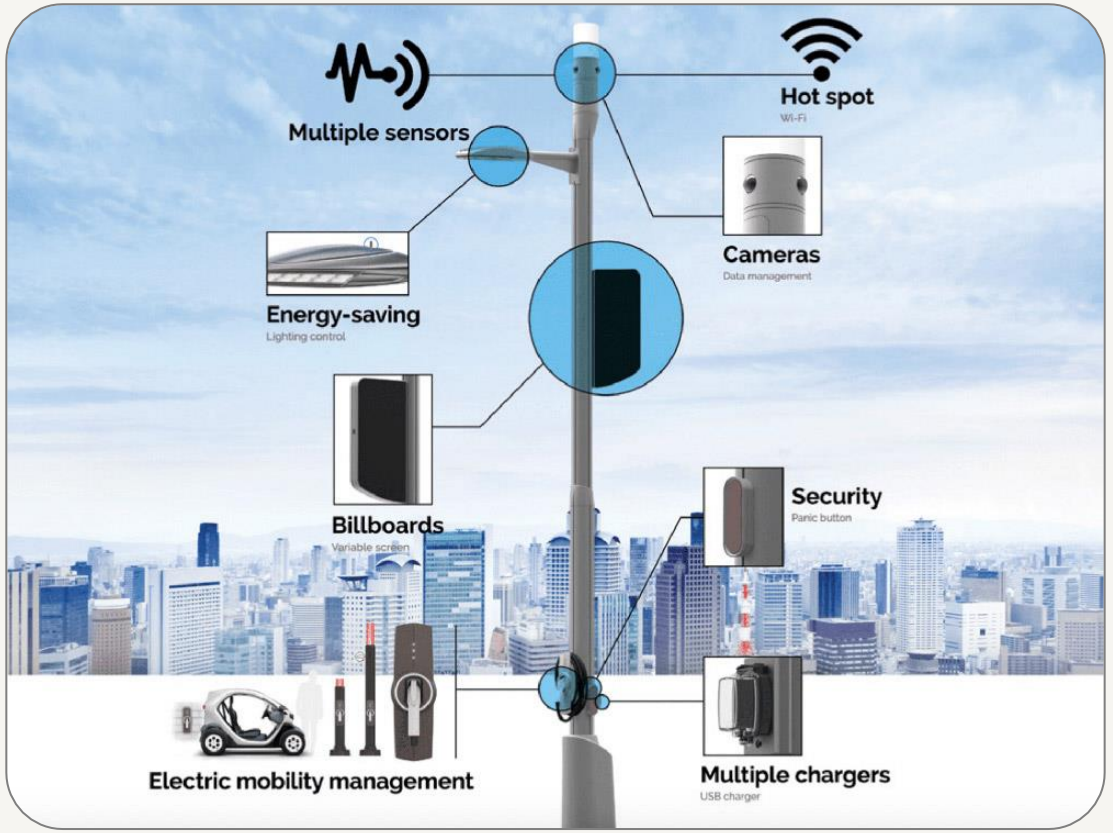
Placement Criterias:

- Road intersections
- Shopping Centers
- Other public areas requiring high surveillances

Component	Description	Detailed Specifications
Camera	Image capture tool	- Resolution: 1080p or higher - Frame rate: minimum 30 fps - Night vision (optional)
Processor	Central Processing Unit	- Type: High performance CPU/GPU - Speed: As needed real-time video analysis
Sensor Module	Sensors for additional data	- Type: Motion, sound and environmental sensors - Compatibility: Integrated with analytical systems
Storage	A place to store video data	- Type: SSD/HDD - Capacity: As needed (minimum several TB)
Connectivity Module	For Data Transmission	- Type: Wi-Fi, Ethernet, 4G/5G - Security: Data encryption, VPN
Resources	Power Supply	- Type: Mains / Battery connection - Capacity: According to operational needs
Analytics Software	Software for Video Analysis	- AI and machine learning - Anomaly detection, face recognition, etc
Operating System	the operating system that runs the device	- Type: Linux, Windows IoT, etc - Compatibility: Analytics application support and data security
Interconnection	Connecting between devices	- Protocols: MQTT, HTTP/S - Standard: Compatible with IoT and video management systems
Dashboard / UI	Interface for users	- Customizable - Real-time analytics display - Alert system
Compliance Standards	Compliance and security standards	- GDPR, HIPAA (if relevant) - Data security and privacy protocols

Use Case 3 : Public Wi-Fi





Placement Criterias:

- Park
- Squares
- Bus/Commuter Line/MRT/LRT Station
- Communal spaces
- Other public places where people gather and need internet access

Use Cases 3 : Electric Vehicle (EV) Charging Station

Type of Charging Infrastructure based on Charging Speed

Type	Maximum Power Delivery
Medium Charging	≥ 8 kW – 22 kW
Fast Charging	≥ 22 kW – 50 kW
Ultrafast Charging	> 50 kW

Configuration Type of Charging Sockets, Plugs and Connectors

Connector Type	Standard	Description
Type 2 Series	SNI IEC 62196-2:2016	AC Charging System
Type AA Series	SNI IEC 62196-3:2014	DC Charging System
Type FF Series	SNI IEC 62196-3:2014	Combined Charging System

Placement Criterias:

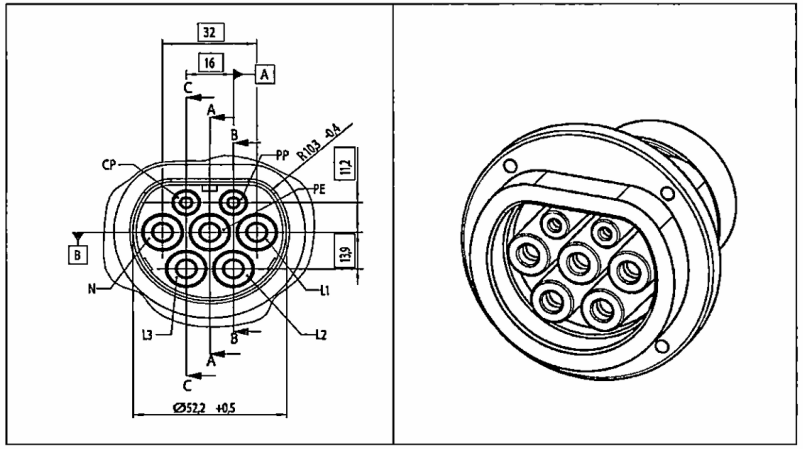
- Parking Areas
- Near Main Roads
- Near Rest Area
- Other strategic locations to support the use of EV

Referring to Permen ESDM No. 1 Tahun 2023

Use Cases 3 : Electric Vehicle (EV) Charging Station

Illustration of Supported Socket, Plug and Connectors

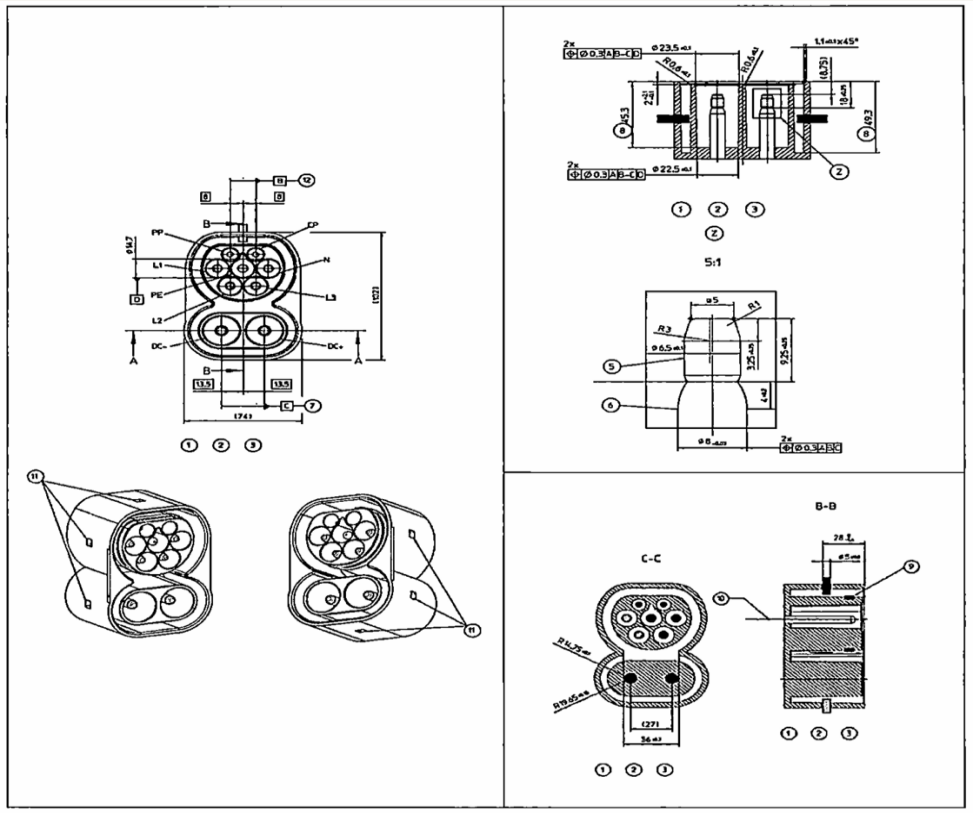
A. Pengisian Ulang Arus Bolak-Balik (*Alternating Current Charging System*) Menggunakan Konektor Tipe 2 (*Type 2 Series*) Berdasarkan SNI IEC 62196-2:2016 dan Perubahannya



Gambar 1. Stop Kontak (*Socket Outlet*)
Tidak Melebihi 480 Volt, 63 Ampere *Fasa* Tiga atau 70 Ampere *Fasa* Tunggal

Type 2 Series Connector is used for **AC Charger.**

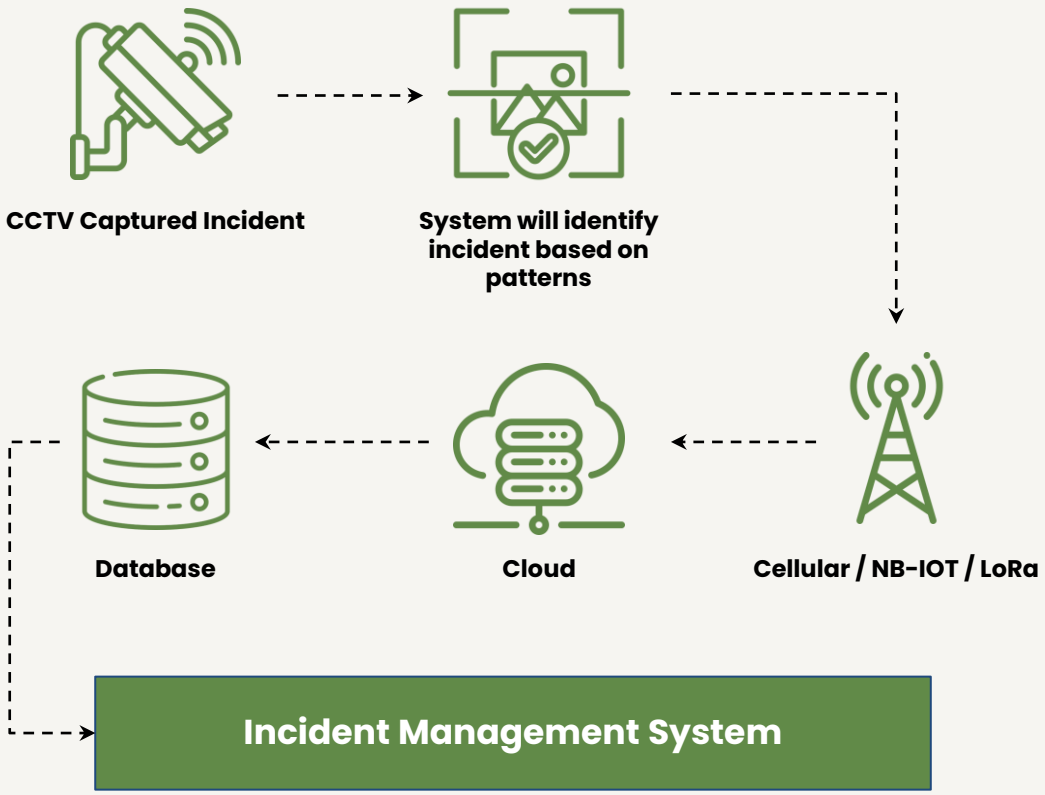
The operation of this type of Socket should **not** exceed:
480 Volt & 63 Ampere (with 3-phase system) or 70 (single phase system)



Gambar 11. *Inlet* Kendaraan Semua Mode (*Vehicle Inlet All Modes*)

Type FF Series Connector is used for **Combined (AC+DC) Charger. Mode 4** is High Powered **Charging Stations** used for **Fast & Ultrafast Charging (preferable)**

Use Cases 4 : Incident Detection



Placement Criterias:

- Major Road intersections
- Entry point to city centers
- Along main roads
- Other public roads requiring high surveillance

Component	Description	Detailed Specifications
Camera	Image capture tool	- Resolution: 1080p or higher - Frame rate: minimum 30 fps - Night vision (optional)
Processor	Central Processing Unit	- Type: High performance CPU/GPU - Speed: As needed real-time video analysis
Sensor Module	Sensors for additional data	- Type: Motion, sound and environmental sensors - Compatibility: Integrated with analytical systems
Storage	A place to store video data	- Type: SSD/HDD - Capacity: As needed (minimum several TB)
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Interconnection	Connecting between devices	- Protocols: MQTT, HTTP/S - Standard: Compatible with IoT and video management systems
Dashboard / UI	Interface for users	- Customizable - Real-time analytics display - Alert system
Compliance Standards	Compliance and security standards	- GDPR, HIPAA (if relevant) - Data security and privacy protocols

Use Case 5 : Air Quality Measurement

Items	Range	Accuracy	Resolution	Sampling Frequency
Wind speed	0-60m/s	±(0.3+0.03V) m/s; V≤30m/s ±(0.3+0.05V) m/s; V>30m/s	0.01m/s	10Hz
Wind direction	0-359.5°	± 3° (when wind speed < 10m/s)	0.1°	10Hz
Air temperature	-40 °C - +85 °C	±0.3°C@25°C	0.01 °C	1Hz
Air Humidity	0-100%RH	± 3% RH (10% - 80% RH)	0.01%RH	1Hz
Atmospheric pressure	500-1100hPa	±0.5hPa (25°C,950-1100hPa)	0.1hPa	1Hz
Noise	30-130dB	±1.5dB	0.1dB	1Hz
PM2.5	0-500ug/m³ (expandable 1000ug/m³)	±(10+10%)ug/m³	1ug/m³	1Hz
PM10	0-500ug/m³ (expandable 1000ug/m³)	±(10+10%)ug/m³	1ug/m³	1Hz
CO	0-10ppm	±5%FS	1ppb	1Hz
NO2	0-5ppm	±5%FS	1ppb	1Hz
SO2	0-5ppm	±5%FS	1ppb	1Hz
O3	0-5ppm	±5%FS	1ppb	1Hz
H2S	0-2ppm	±5%FS	1ppb	1Hz
TVOC	0-10ppm	±5%FS	1ppb	1Hz

Working temperature	-30°C - 70°C
Output signal	Default RS485 interface, ModbusRTU; Customizable SDI-12
Max. output frequency	Passive mode: 1/S Active mode: 1/min
Power supply	DC9-24V
Protection level	IP65
Fixing method	Default fixed by sleeve (Flange fixing or bending plate fixing optional)
Fixing bracket	None for standard products, 1.5m and 1.8m brackets are optional
Cable	Default 3m cable (other length optional)
Customized functions	Heating function

Placement Criterias:

- In areas with expected high pollution levels
- Near highways
- Industrial areas
- City centers

Use Case 6 : Public Information & Announcement

Placement Criterias:

- Bus Stops
- Stations
- Other public places where information can be easily accessed by many people

Component	Description	Detailed Specifications
Panel	Size of panel	30 - 65 Inch LCD
Installation Type	Device installation form	Pole
Resolution	Resolution for LCD	1080 x 1920 pixel
Brightness	To ensure visibility and readability	2500 nit
Storage	A place to store video data	- Type: SSD/HDD - Capacity: As needed (minimum several TB)
Air Conditioning	For temperature regulation and preventing condensation	Cooling and heating system
Connectivity Module	For Data Transmission	- Type: Wi-Fi, Ethernet, 4G/5G - Security: Data encryption, VPN
Resources	Power Supply	- Type: Mains / Battery connection - Capacity: According to operational needs
Operating System	the operating system that runs the device	- Type: Linux, Windows IoT, etc - Compatibility: Analytics application support and data security
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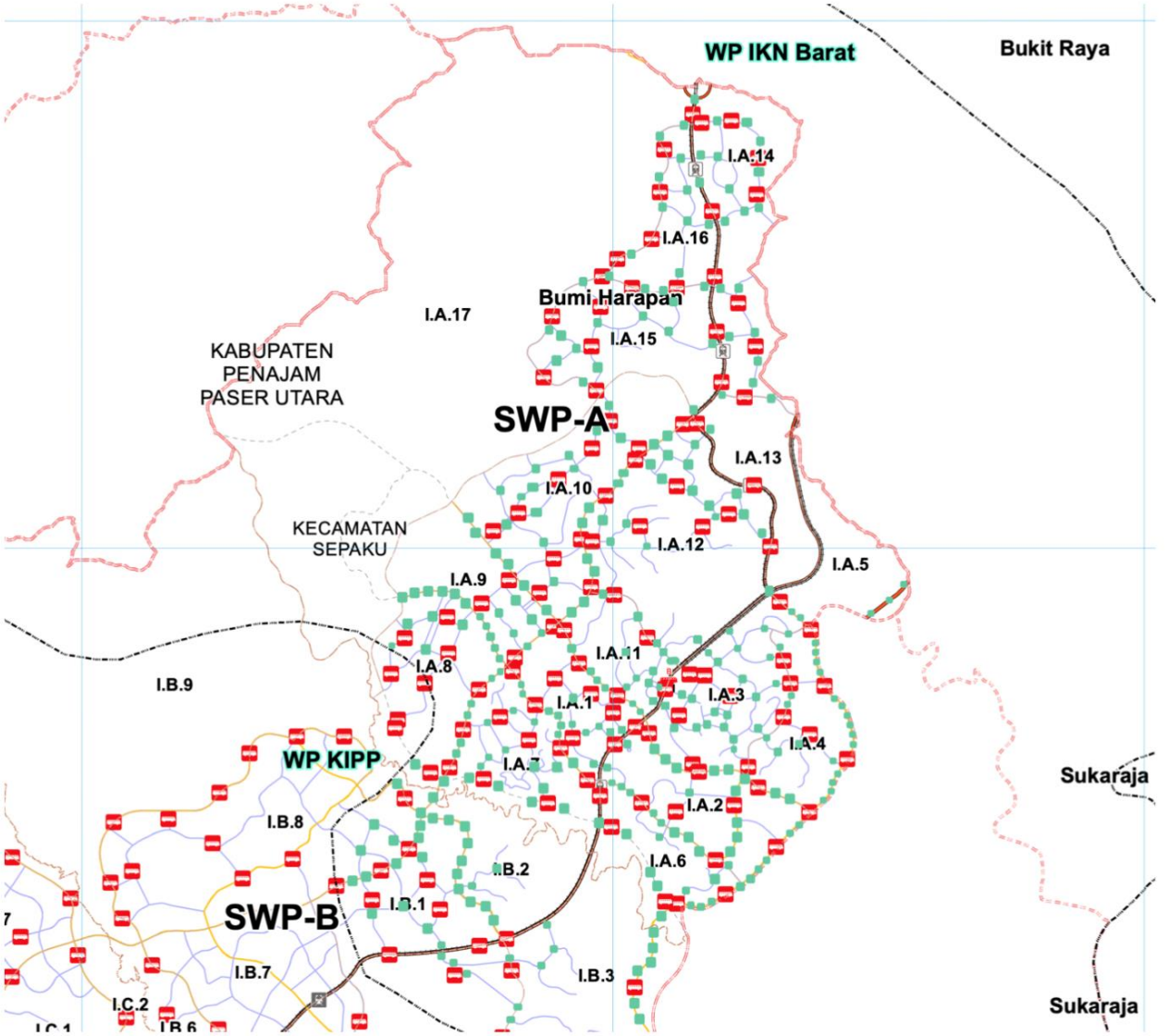
Smart Pole Installation Points



There are around **311 Smart Pole** implementation point plans which are focused on the following points. There are 7 implementation points indicated by green boxes ( )

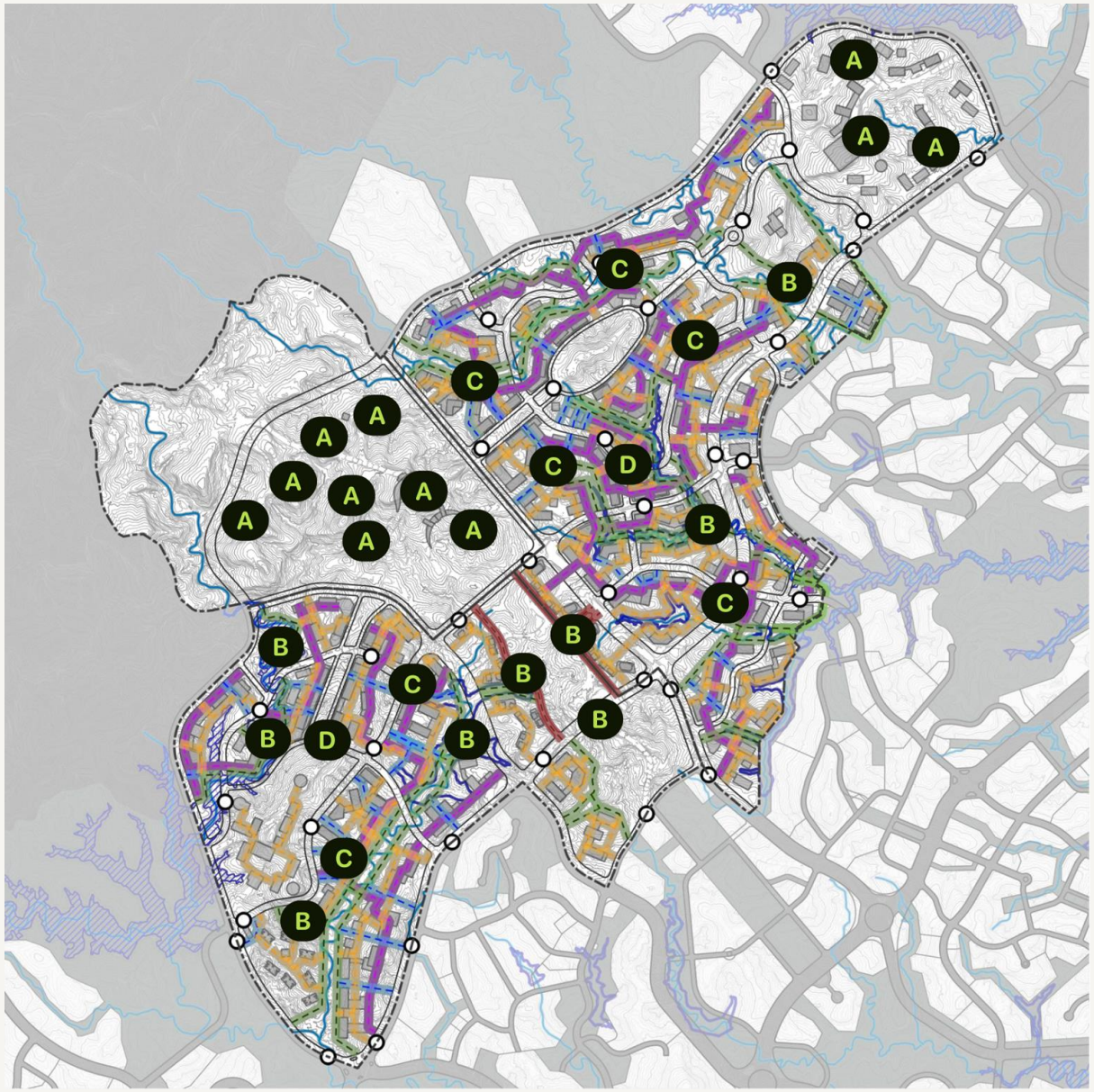
Stage of Development:

Level	Target Amount	Installation Point
March - July 2024	29 units	- I.A.9 - I.A.1 - I.A.8
July - Dec 2024 / Sept - Dec 2024	60 units	- I.A.11 - I.A.3 - I.A.7 - I.A.10 - I.B.2
2025 and beyond	222 units	Areas not mentioned above.

Notes: *installation points are indicative and open for discussion. Prospective investors and consortiums may propose different points that's considered more strategic on their Feasibility Study*

Smart Pole Installation Points

Government Sub-Sub Development Area
KIPP Sub WP 1A



We separate smart poles into **4 category**, each has its own focus:

- Type A: Focusing for vital residency such as president office, DPR, and MPR. Has all-round utility, including SPKLU, CCTV, Public Wifi, etc
- Type B: Focusing for "Green" spaces such as park. Focusing on providing connectivity and communication. Has digital signage, wifi, CCTV, SPKLU.
- Type C: Focusing on pedestrian with high volume and velocity. Has emergency button, CCTV, digital signage.
- Type D: Focusing to capture air quality. Including air pollution sensor.

Notes: *installation points are indicative and open for discussion. Prospective investors and consortiums may propose different points that's considered more strategic on their Feasibility Study*

Smart Pole Type Breakdown for Showcase Purpose

Component	Type A *Government Residents*	Type B *Green Open Area*	Type C *High Volume Pedestrian*	Type D *Air Pollution Sensor*
LED lights	V	V	V	V
Light Sensor	V	V	V	V
Motion sensor	V	V	V	V
Smart Pole Controller	V	V	V	V
Management system	V	V	V	V
Cabinet Control	V	V	V	V
Connectivity (Wifi)	V	V		
Power Supply (SPKLU)	V	V		
Digital Display	V	V	V	
Emergency Button	V	V	V	
Air Quality Sensor				V
CCTV	V	V	V	V
TOTAL	**11**	**9**	**7**	**2**

We separate smart poles into **4 category**, each has its own focus:

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Sumber Ilustrasi: Kementerian PUPR

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