Metering technology

for traction energy consumption

Philippe Aubin

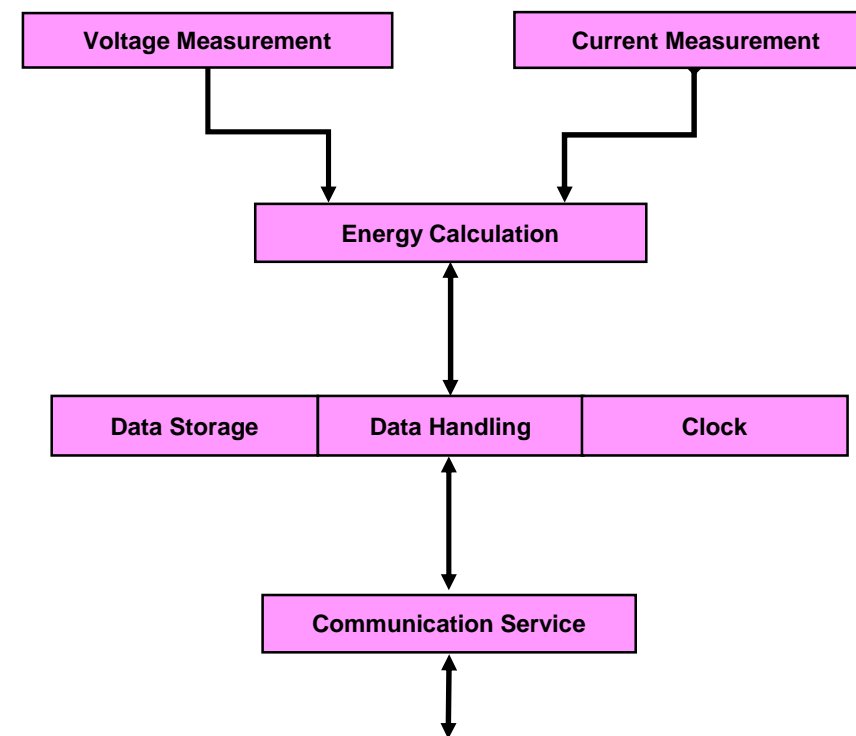**Jean-Pierre Guy**

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I only want to pay
the real consumption

I need measurements
to know how much
energy we save

… complying with
the EN50463 standard

I can't stop
a locomotive
for a week to
install metering
systems
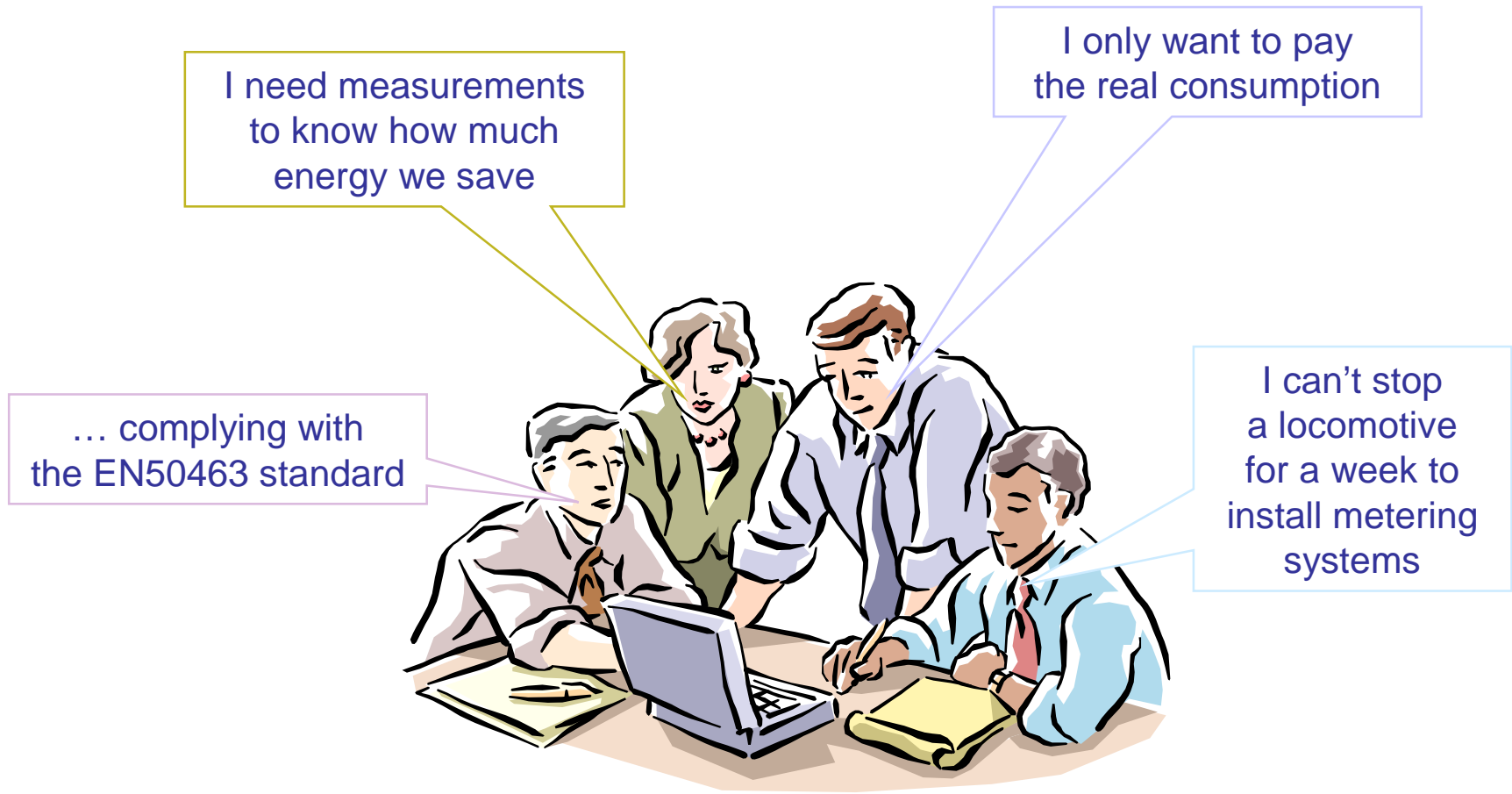
▶ New EN50463 standard

▸▸ **Supersedes the EN 50463:2007**

▸▸ **In line with the new TSI**

▸▸ **Scope is extended**
- **Part 1: General**
- **Part 2: Energy Measuring**
- **Part 3: Data Handling**
- **Part 4: Communication**
- **Part 5: Conformity Assessment**

▸▸ **System and functional approach**
- **Not a product description**
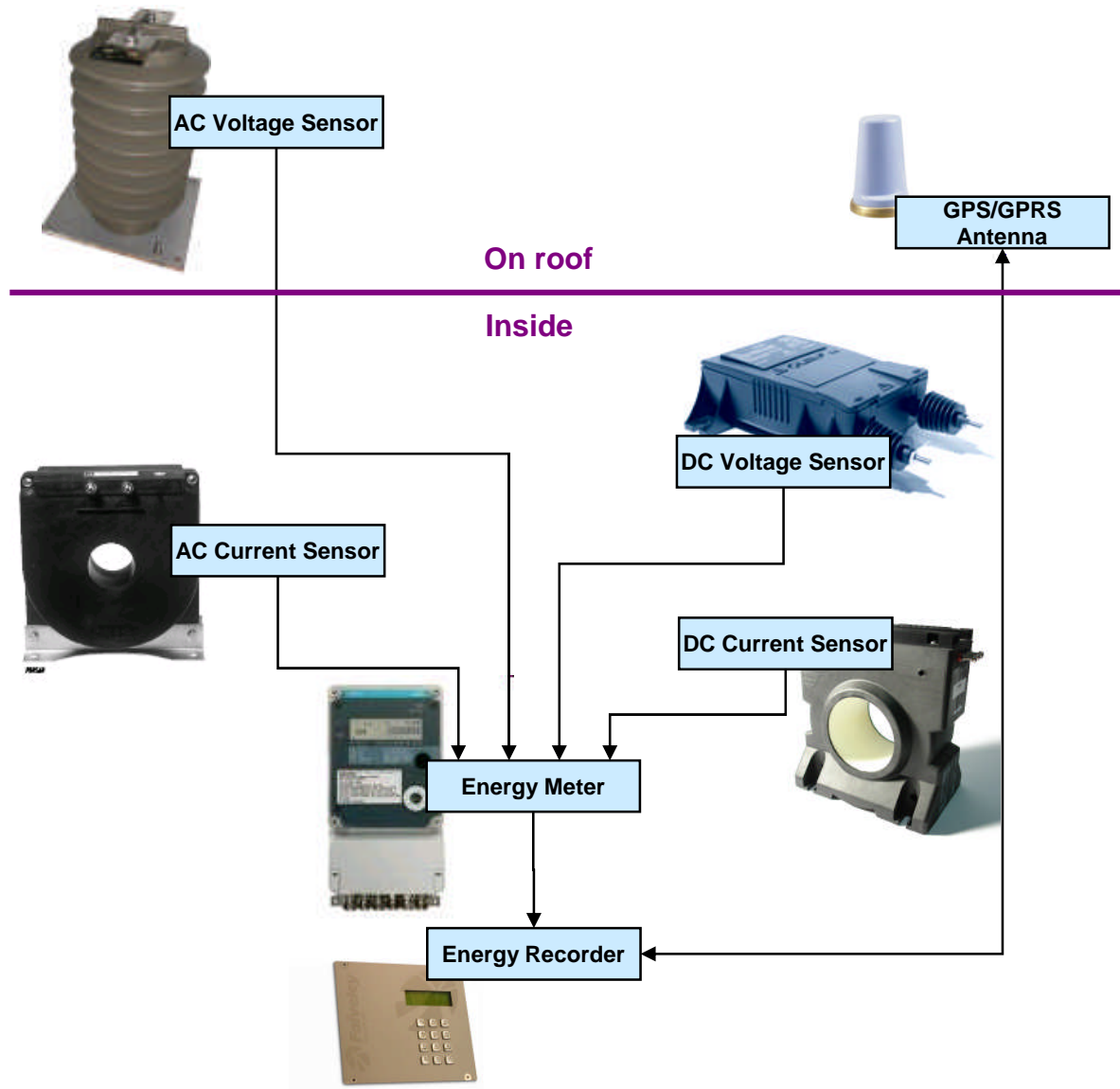- **Allows different product architectures**

Voltage Measurement	Current Measurement

Energy Calculation

Data Storage	Data Handling	Clock

Communication Service

Functional block and data flow diagram

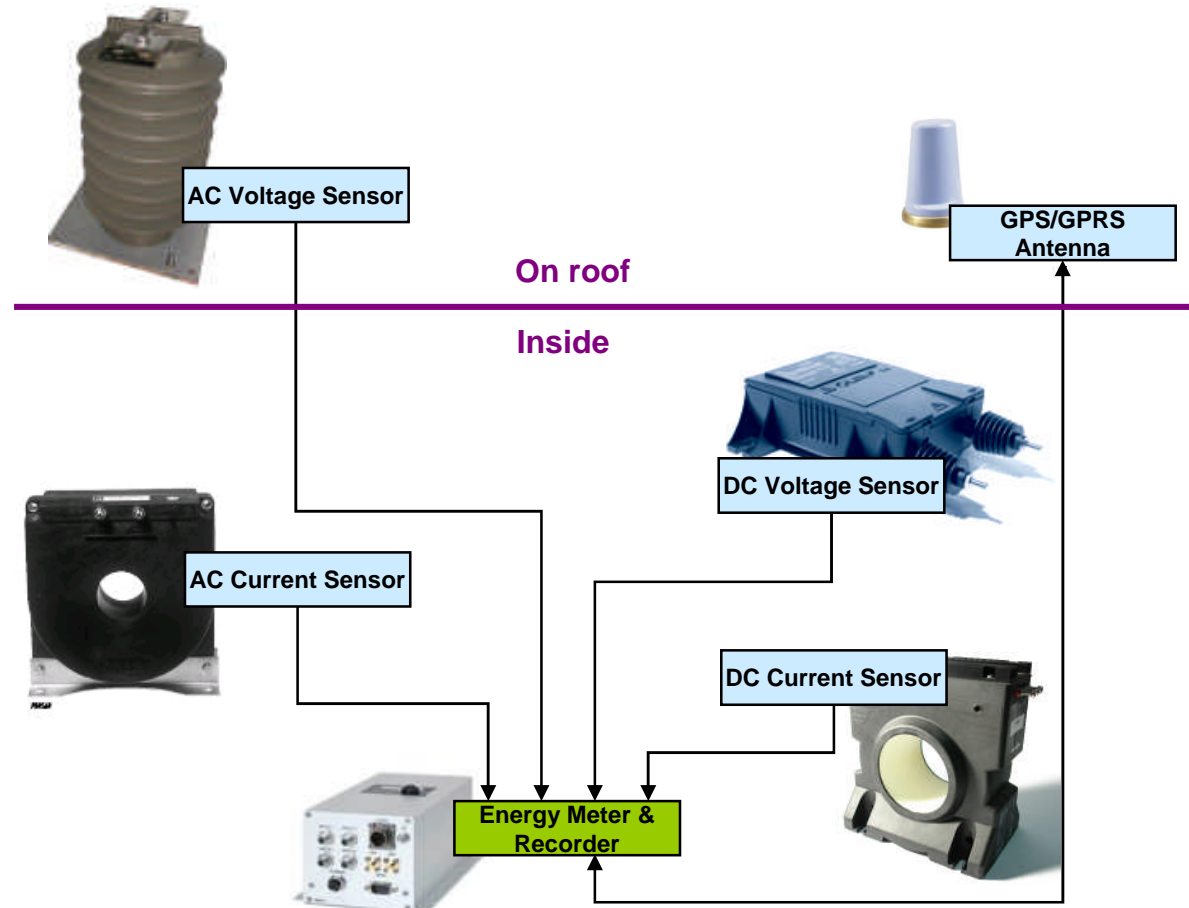▶ # Current architecture

Based on industrial architecture

▸ **Analogue Sensors**

- Includes the high voltage insulation

▸ **Energy Meter**

- Measures voltages and currents
- Calculates energies (active/reactive, in/out)
- Stores load profiles versus date and time

▸ **Energy Recorder**

- Adds the location to the load profiles
- Stores and keeps the last 60 days data
- Transmits data to the central database

AC Voltage Sensor

GPS/GPRS Antenna

On roof

Inside

DC Voltage Sensor

AC Current Sensor

DC Current Sensor

Energy Meter

Energy Recorder

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▶ ## Current architecture

Variation

⟫ **Energy Meter and Energy Recorder are merged into one device**

AC Voltage Sensor

GPS/GPRS Antenna

On roof

Inside

DC Voltage Sensor

AC Current Sensor

DC Current Sensor

Energy Meter & Recorder

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▶ **Sensors in the Circuit Breaker**

On roof

Inside

AC Voltage & Current Sensor

GPS/GPRS Antenna

DC Voltage Sensor

DC Current Sensor

Energy Meter & Recorder

▸▸ **AC voltage sensor and AC current sensor are included into the main AC circuit breaker**
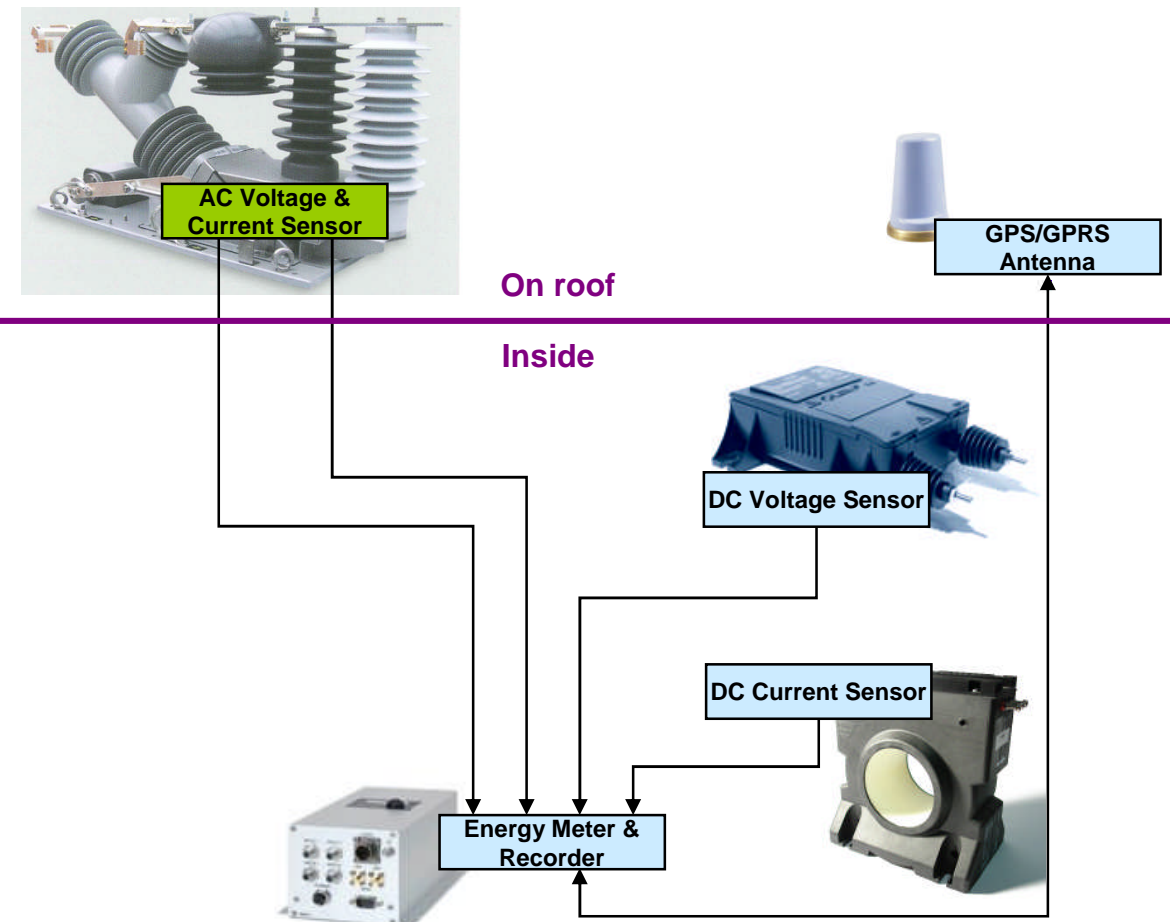
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▶ **Energy measurement on the roof**

   ▸▸ **No frame modification**

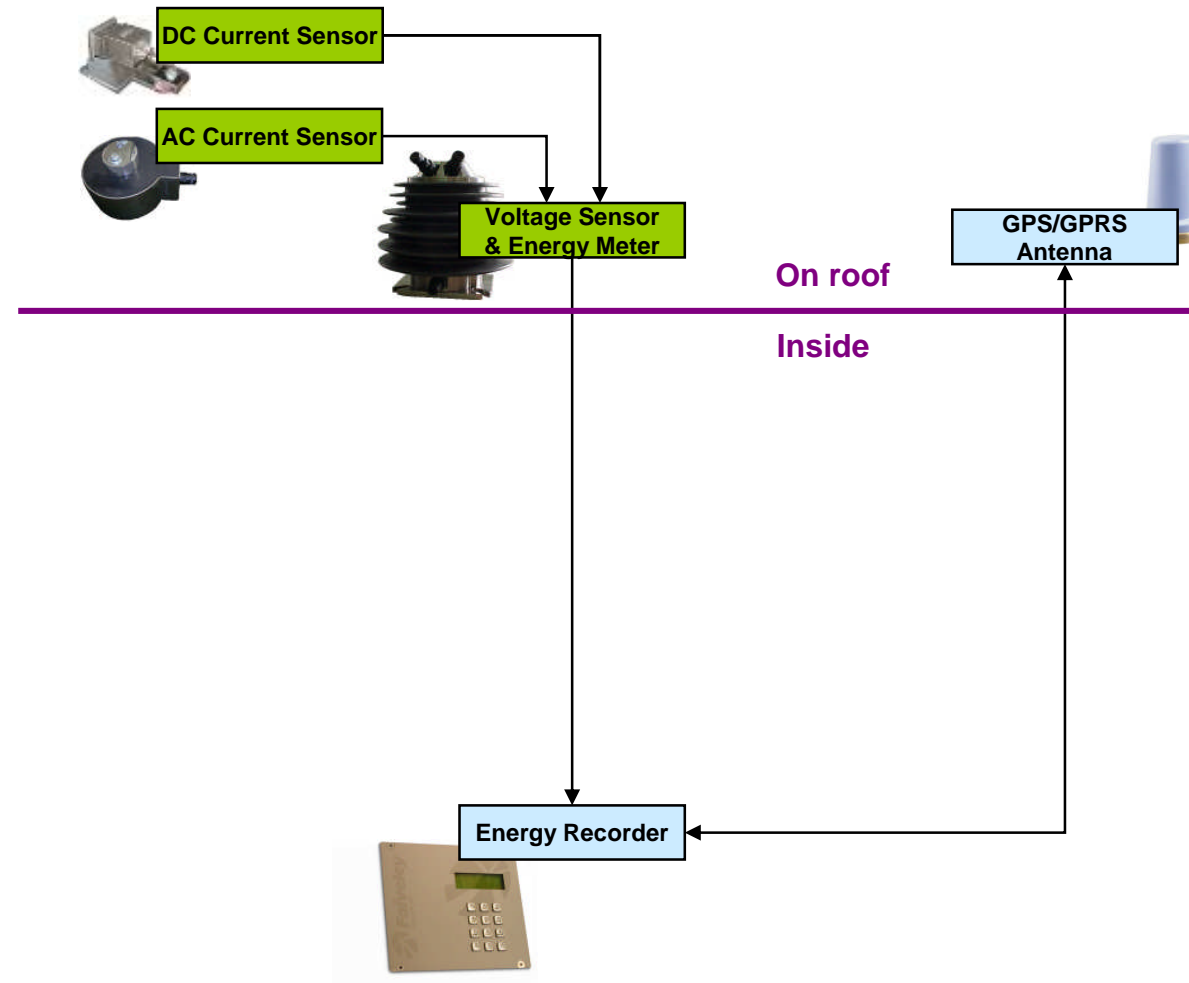   ▸▸ **Replace existing insulators, Quick and simple to install**
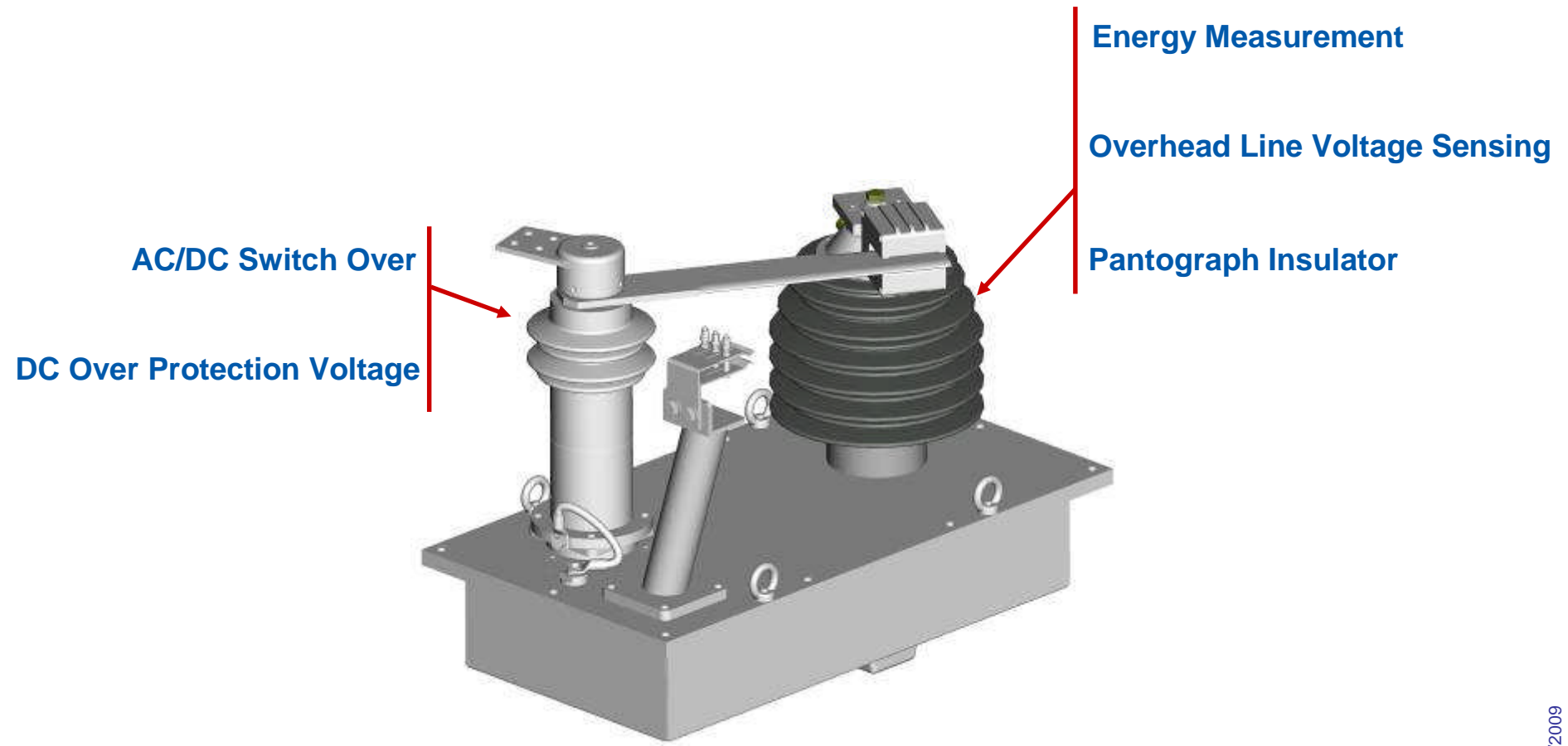
       • **On a pantograph**

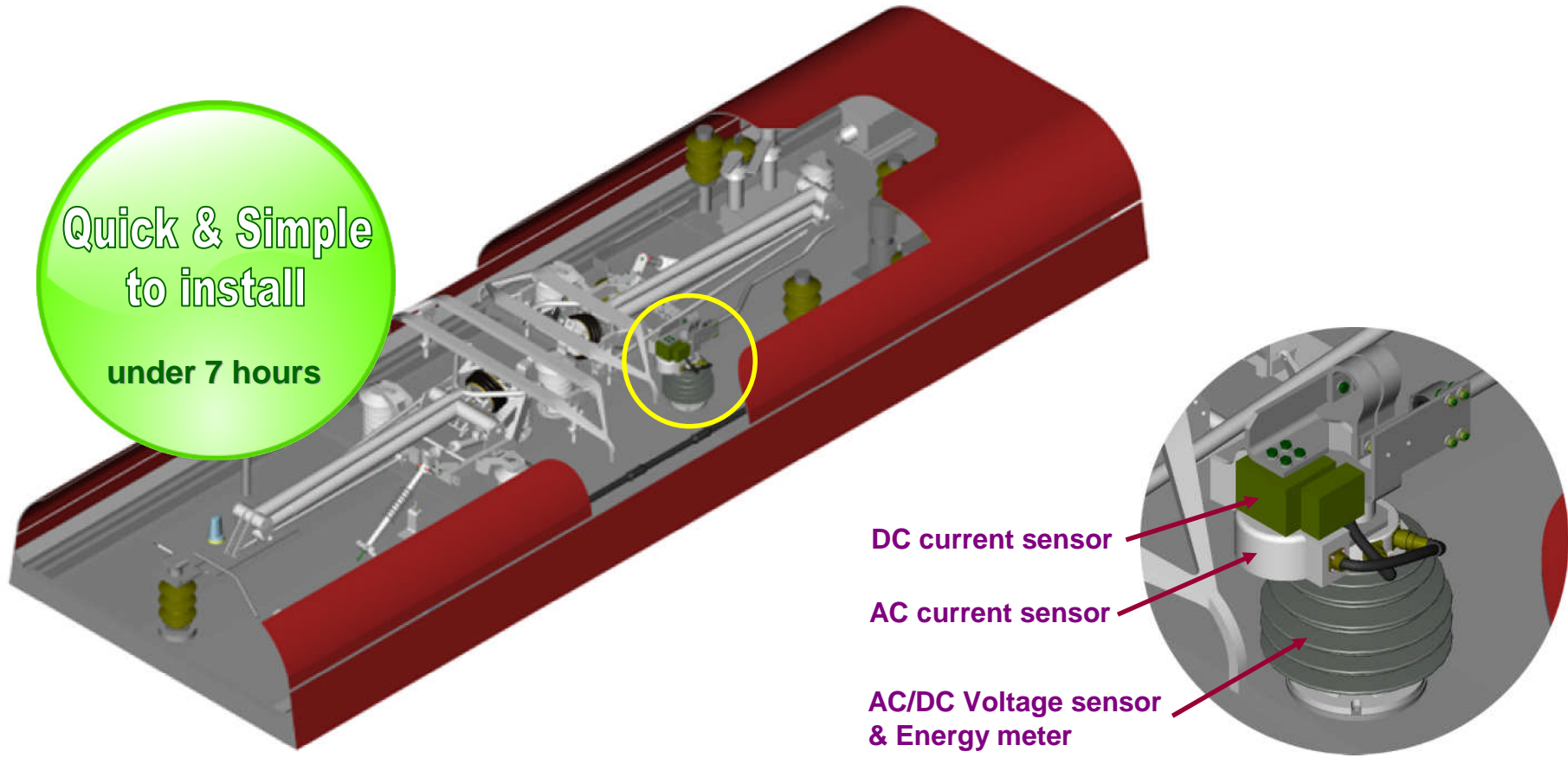   • **On a bus bar**

   ▸▸ **Sensor with redundancy built-in**

DC Current Sensor

AC Current Sensor

Voltage Sensor & Energy Meter

GPS/GPRS Antenna

On roof

Inside

Energy Recorder

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▶ **Compact & Integrated systems on the roof**

Energy Measurement

Overhead Line Voltage Sensing

AC/DC Switch Over

Pantograph Insulator

DC Over Protection Voltage

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Quick & Simple
to install

under 7 hours

DC current sensor

AC current sensor

**AC/DC Voltage sensor
& Energy meter**

Thank you for your attention

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