TSRG Flexible Connections Subgroup

Distributed Flexible Interconnections Solutions

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GridEdge Networks Overview

- **MA Grid Enhancing Technology Company**
- Grid integration of clean energy, energy storage and electric vehicles
- Reducing interconnection cost and accelerating deployment time using flexible technology innovations: **More DER, Faster, Lower Cost**
- Developed a distributed flexible interconnection platform for DER integration
- **Distributed control optimized for a distributed grid**

- Awarded two NYSERDA grants for Product Development and Field Testing of DERCOM in partnership with Avangrid

  - PON 4074 - High Performing Grid "DER Closed-loop Control System Using Distributed Communications" (2021)
  - PON 4393 – The Future Grid "Flexible Interconnections and Grid Services Platform for DER, ESS and EV Charging" (2023)

- Awarded two MassCEC grants (2022, 2023)

- Awarded CT PURA IES grant (2024)
  - Grid integration of EV Fleet with V2G technology
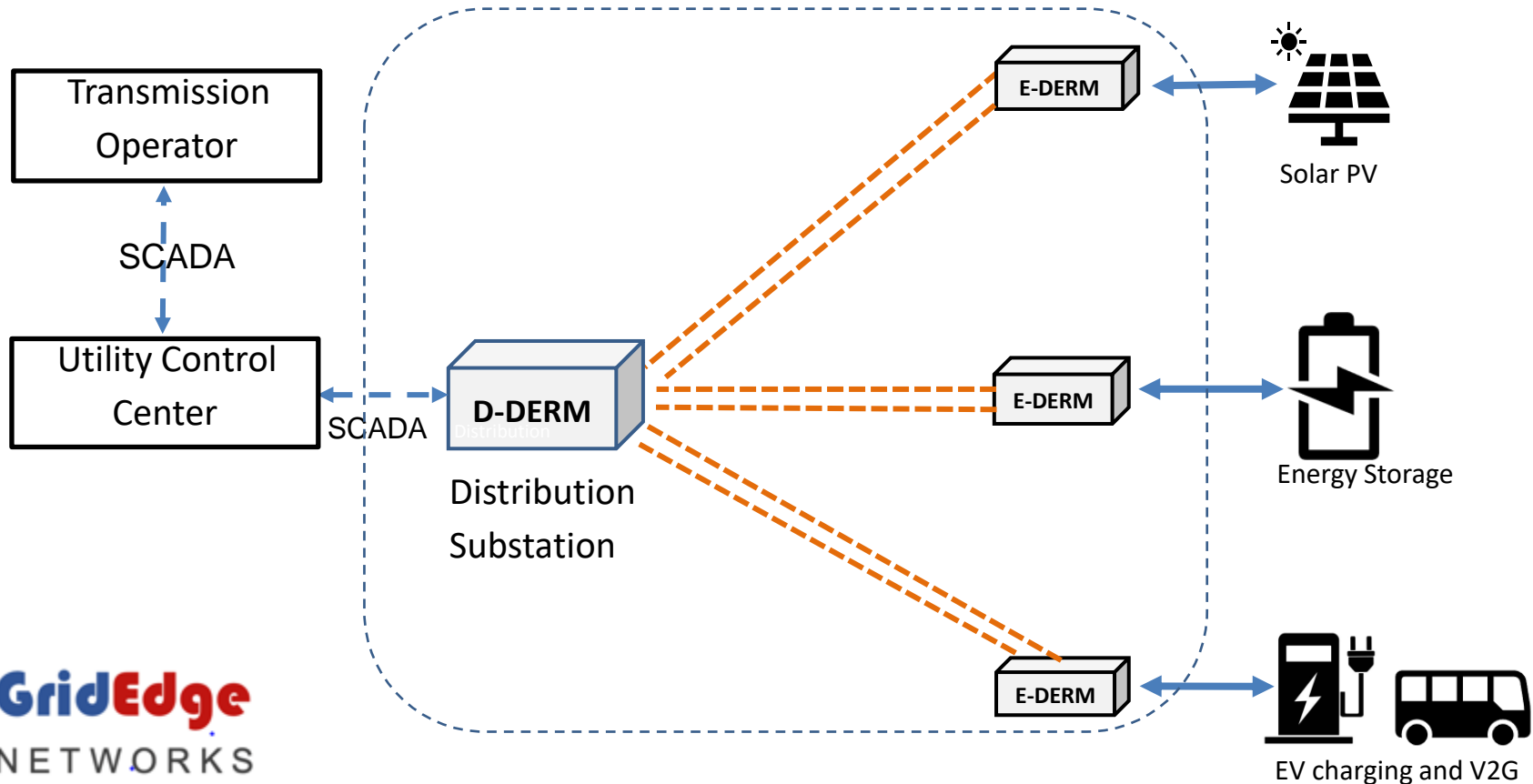
Distributed Flexible Interconnection Solution

Localized Grid Flexibility Platform
- Closed loop control algorithms
- Flexible interconnections
- Flexible load/generation management
- Flexible charging/discharging

Transmission Operator

SCADA

Utility Control Center

SCADA

D-DERM
Distribution

Distribution Substation

E-DERM

E-DERM

E-DERM

Solar PV

Energy Storage

EV charging and V2G

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GridEdge Pilot Projects

Utility partner: Avangrid (UI, NYSEG, RG&E)

Solar PV

Seaside Solar
Bridgeport CT (UI)

Woodoak Solar
Tusten NY (NYSEG)

**Flexible
Interconnections**

EV Fleet integration with V2G

North Haven CT (UI)

Flexible Charging and Discharging

Model of cooperation between utility and EV Fleet
operator serving the local community

Energy Storage
EV Charging

Scottsville Site
Rochester NY (RG&E)

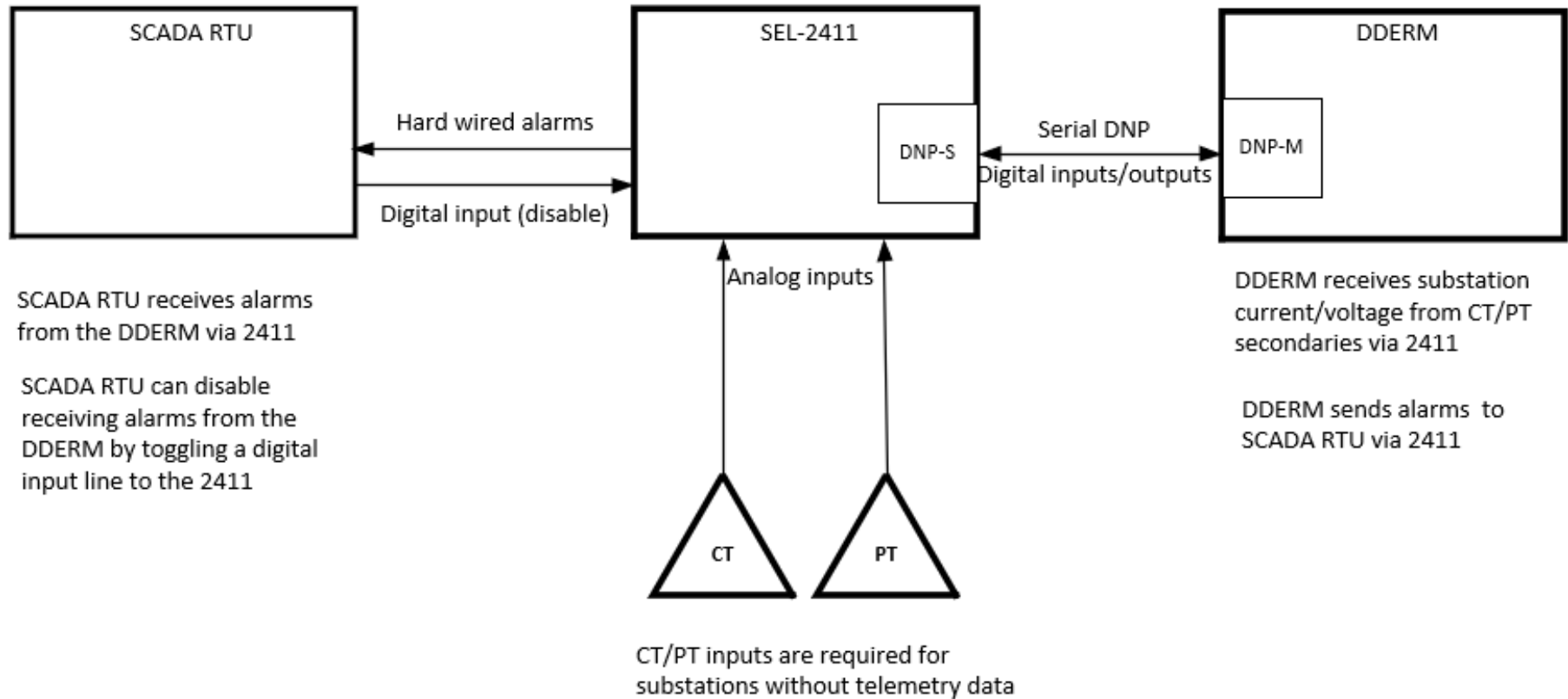**Flexible Load Management
Hybrid use case**

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Luxton Lake Pilot Project
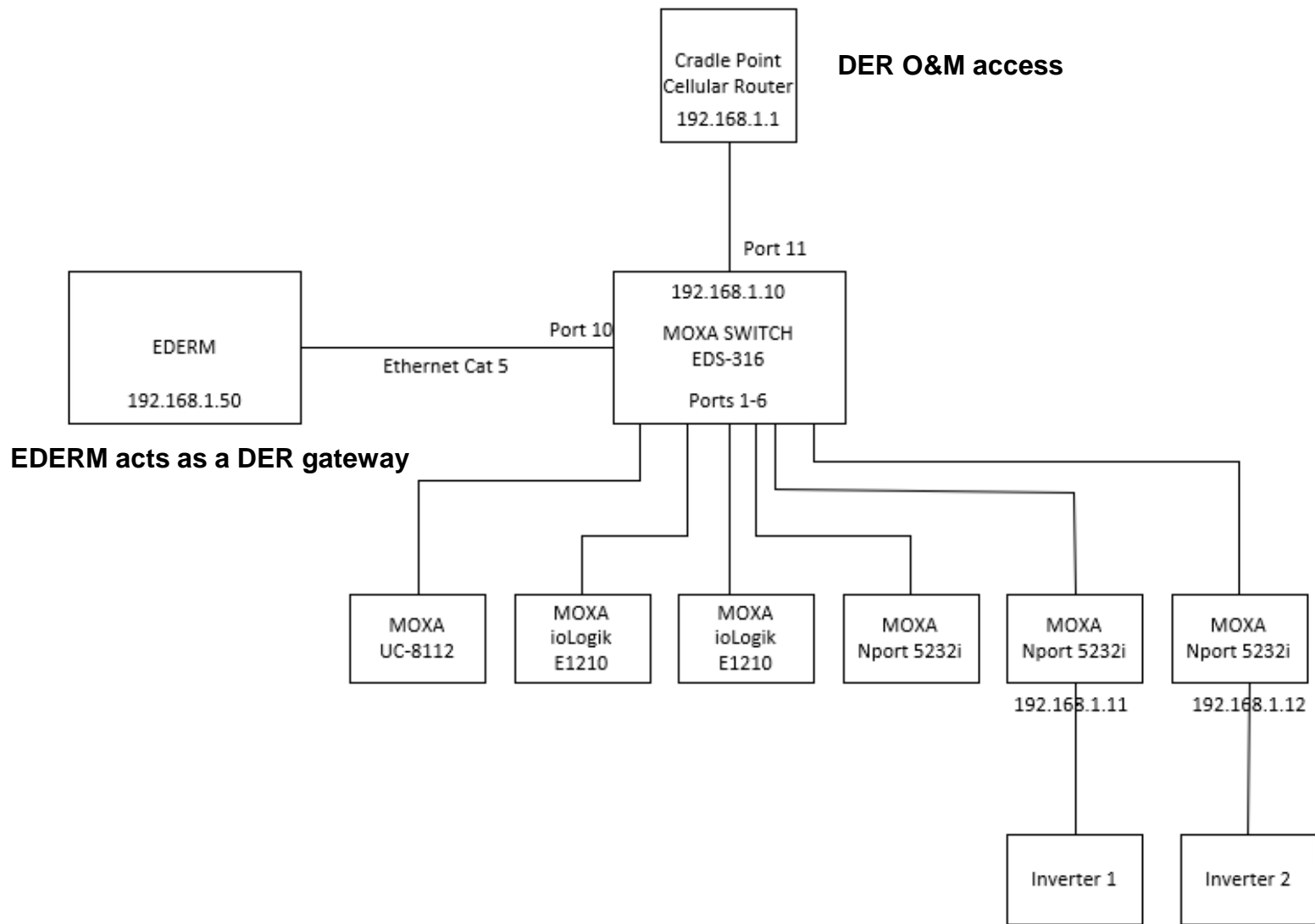

Challenge:
Substations in rural locations lack automation and comms

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Luxton Lake Substation Diagram

SCADA RTU	SEL-2411	DDERM

Hard wired alarms

DNP-S

Serial DNP

DNP-M

Digital input (disable)

Digital inputs/outputs

SCADA RTU receives alarms
from the DDERM via 2411

SCADA RTU can disable
receiving alarms from the
DDERM by toggling a digital
input line to the 2411

Analog inputs

DDERM receives substation
current/voltage from CT/PT
secondaries via 2411

DDERM sends alarms to
SCADA RTU via 2411

CT

PT

CT/PT inputs are required for
substations without telemetry data

GridEdge solution:
Local substation DERMS capability
Turnkey system with integrated comms

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Woodoak Solar Site Diagram

DER O&M access

Cradle Point
Cellular Router
192.168.1.1

Port 11

192.168.1.10

MOXA SWITCH
EDS-316

Port 10

EDERM

Ethernet Cat 5

192.168.1.50

Ports 1-6

EDERM acts as a DER gateway

MOXA
UC-8112

MOXA
ioLogik
E1210

MOXA
ioLogik
E1210

MOXA
Nport 5232i

MOXA
Nport 5232i

MOXA
Nport 5232i

192.168.1.11

192.168.1.12

Inverter 1

Inverter 2

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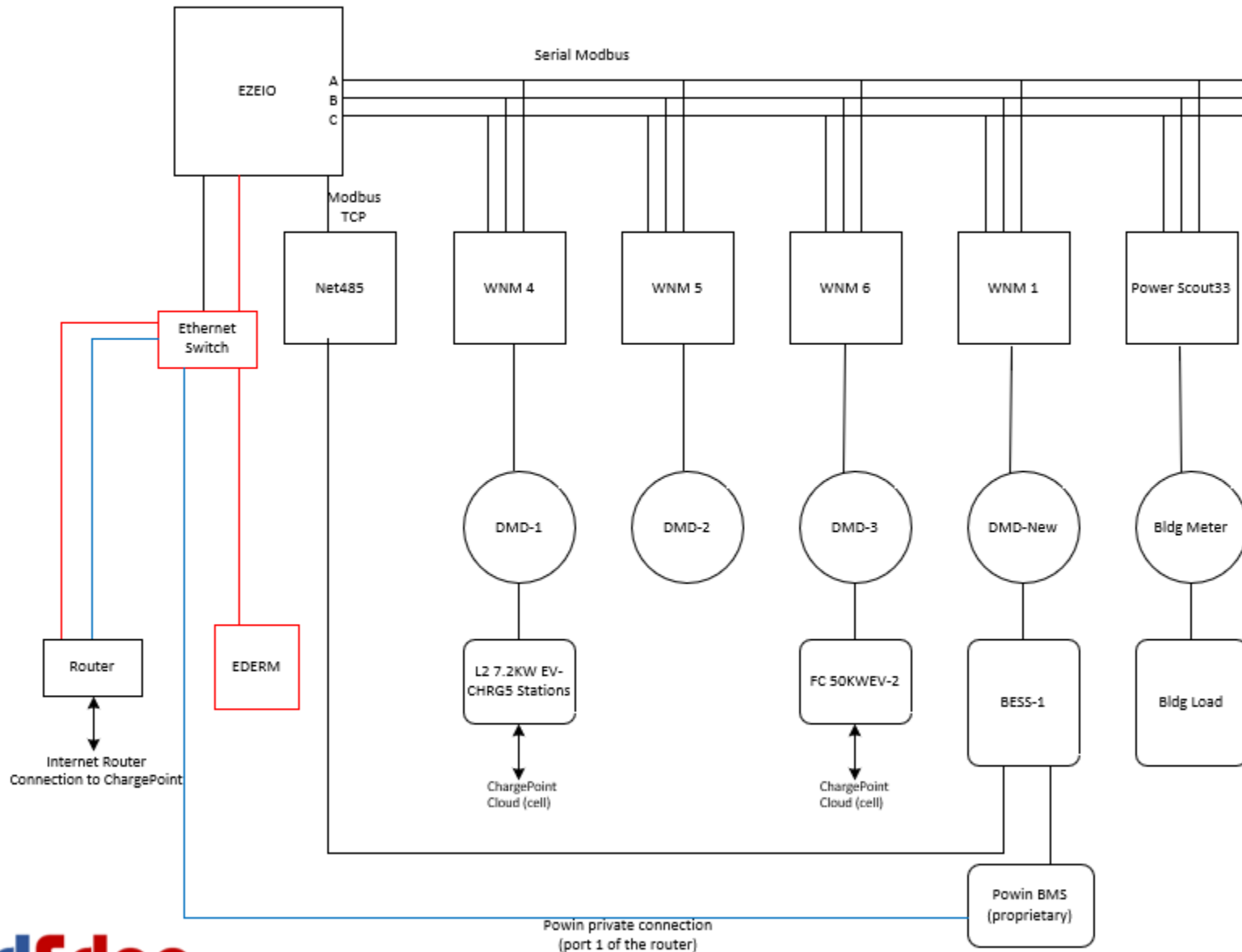
Scottsville Road Pilot Project

Challenge:
Onsite energy storage and EV charging stations
Currently managed by their respective vendors
Access is via proprietary cloud connections

GridEdge Solution:
Hybrid use case algorithm with local optimization
System integration of various equipment

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Scottsville Road Site Diagram

EDERM connects to BESS via the EZEIO and Net485 over an existing wired Ethernet connection
EDERM connects to ChargePoint API over an Internet connection via the existing site router
Red lines represent new added elements

ACES V2G Pilot Project

Challenge:
V2G charger function not enabled – used as V1G charger
Solar PV co-located with V2G charger affects REC tariff

ACES School Bus Site
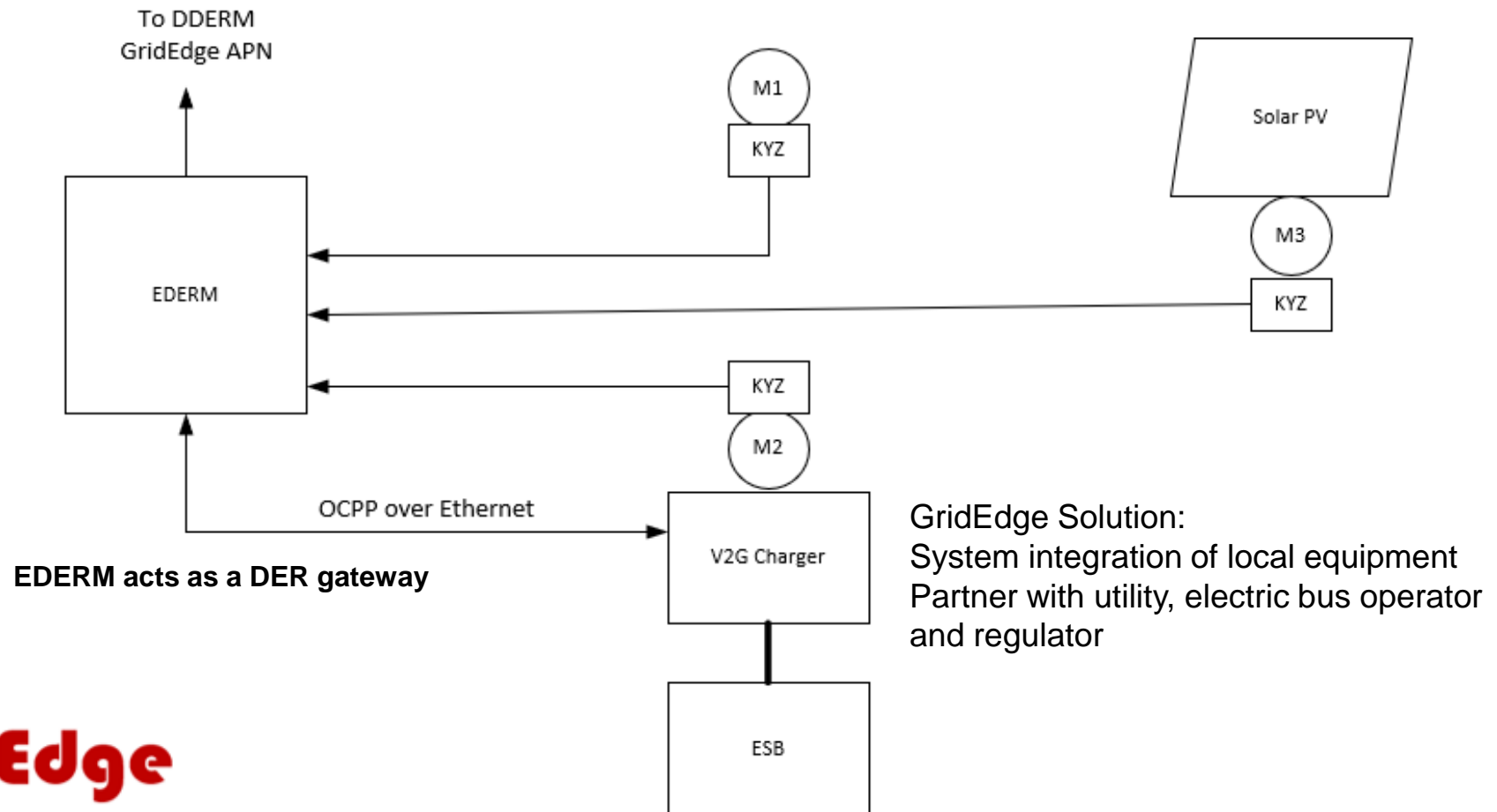
M1 – 2-way existing facility revenue meter
M2 – 2-way new non-revenue meter for V2G charger
M3 – 1-way existing solar REC meter
KYZ – pulses from meters representing KWh
EDERM connection to charger needs to be validated with manufacturer BorgWarner
EDERM algorithm calculates KWh from the three meters and monitors and controls charging/discharging

To DDERM
GridEdge APN

M1

KYZ

Solar PV

M3

KYZ

EDERM

KYZ

M2

OCPP over Ethernet

EDERM acts as a DER gateway

V2G Charger

GridEdge Solution:
System integration of local equipment
Partner with utility, electric bus operator and regulator

ESB

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Distributed Flexible Interconnection Benefits

- Readily available
- Simple, fast and secure
- Local optimization benefits utility and DER owner
- Works with existing interconnection process
- No effect on rate payer
- Substation DERMS integrates with enterprise DERMS and ADMS
- Standards based, interoperable with existing utility systems
- Learnings can be used for a future grid-wide DERMS deployment

Thank You!

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