Open LV
Your local electricity data

Opening up the smart grid:

Making energy usage data open access for the first time

5 October 2017 I Balancing Act

Delivered by:
ea technology

WESTERN POWER DISTRIBUTION
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Your invitation to access your local electricity data

- How OpenLV fits into Western Power Distribution's innovation plan
  - Mark Dale, Western Power Distribution
- What is OpenLV?
  - Richard Potter, EA Technology
- OpenLV – engaging with communities
  - Rachel Coxcoon, CSE
- OpenLV – engaging with business and academia
  - Gill Nowell, EA Technology
- OpenLV - the movie
- Q&A

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How OpenLV fits within Western Power Distribution's innovation plan

Mark Dale, Western Power Distribution

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INNOVATION

WESTERN POWER DISTRIBUTION FLEXDGRID

WESTERN POWER DISTRIBUTION PLUGS AND SOCKETS

WESTERN POWER DISTRIBUTION SOLA BRISTOL

WESTERN POWER DISTRIBUTION LOW CARBON HUB

WESTERN POWER DISTRIBUTION OPEN LV NEW

WESTERN POWER DISTRIBUTION NETWORK EQUILIBRIUM

WESTERN POWER DISTRIBUTION SMART ENERGY ISLES

WESTERN POWER DISTRIBUTION NETWORK TEMPLATES

WESTERN POWER DISTRIBUTION FALCON

Future Networks Programme

Assets

- Telemetry
- Decision support
- Improved assets
- New assets
- Flexibility
- Automation
- Incident response

Customers

- New connections
- Upgrades
- Information
- Self Serve
- Products/Service
- Tariffs
- Communities

Operations

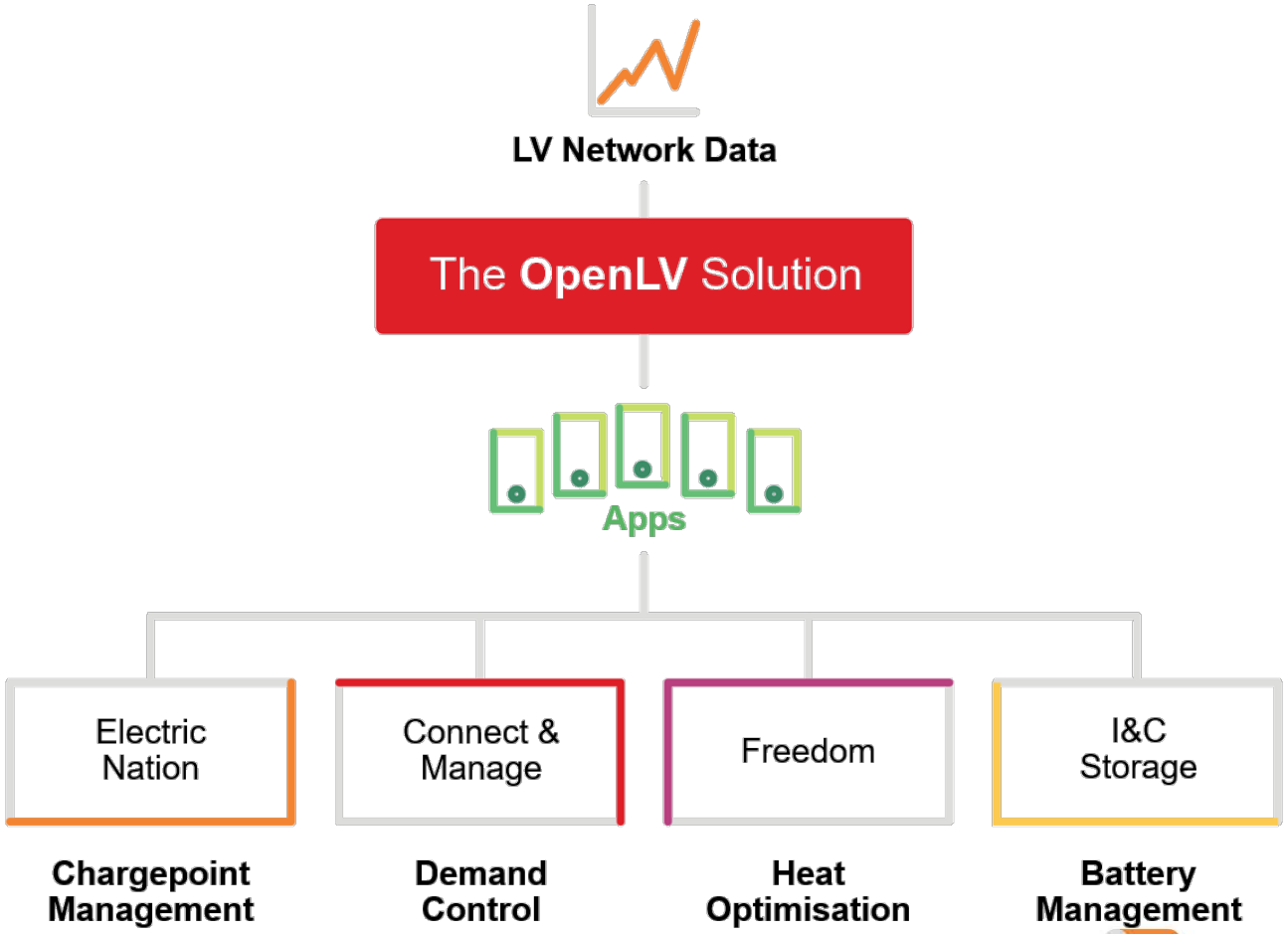
- Reliability
- Forecasting
- DSO
- DSR
- GBSO Interface
- Efficiency
- SHE and Security

Network and Customer Data

- **Airborne Inspections**
- **AIRSTART[1]**
- **Telecoms Analysis**
- **Superconducting Cable**
- **SF6 Alternatives**
- **MVDC Test Lab**
- **Smart Energy Laboratory**
- **Statistical Ratings**
- **Primary Network Power Quality Analysis**
- **Hybrid Heat Pump Demonstration**
- **Hydrogen Heat & Fleet**
- **Carbon Tracing**
- **HV Voltage Control**
- **Solar Storage**
- **LV Connect and Manage**
- **Sunshine Tariff**
- **CarConnect**
- **Industrial & Commercial Storage**
- **DSO/SO Shared Services**
- **Project SYNC**
- **Project ENTIRE**
- **Smart Meter data for Network Operations**
- **Distribution Operability Framework**
- **Times Series Data Quality**
- **Voltage Reduction Analysis**
- **LV Connectivity**
- **Smart Systems and Heat[2]**

Note: 1 – Funded by Aerospace Technology Institution; Note 2 – Funded by the Energy Systems Catapult

Low Voltage (LV) Network Innovation



Open LV

The project team

WESTERN POWER DISTRIBUTION

regen
transforming energy

Centre for Sustainable Energy

nccgroup

nortech
... simple and elegant solutions for monitoring remote assets reliably and economically

impulse
INDUSTRIAL COMPUTING | EMBEDDED SOLUTIONS

ea technology

Promote
Marketing & communication

Lucy Electric

GRIDKEY

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What is OpenLV?

Richard Potter, EA Technology

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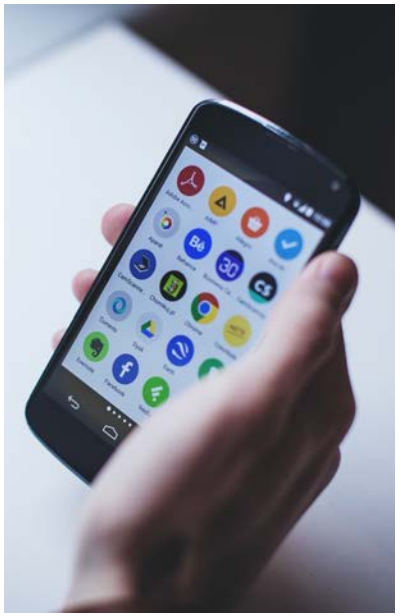
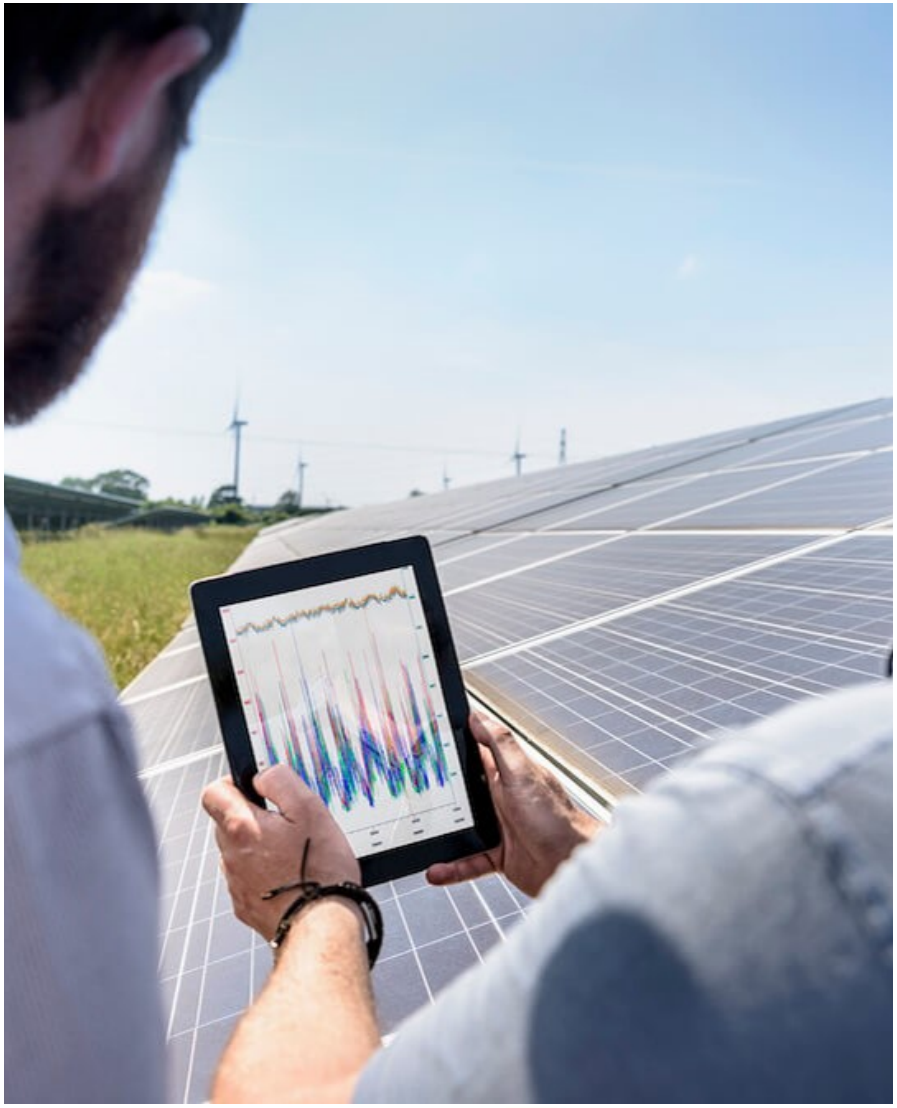
Project overview

- Project Aims:
  - To trial an open, flexible platform that could be deployed to every Low Voltage (LV) substation in Great Britain
  - To demonstrate the platform's ability to provide benefits to the network, customers, commercial entities and research organisations
- Timescales: December 2016 to April 2020
- Funding Source: Network Innovation Competition
- Value: £5,925,000
- Project host: Western Power Distribution
- Delivery Lead: EA Technology

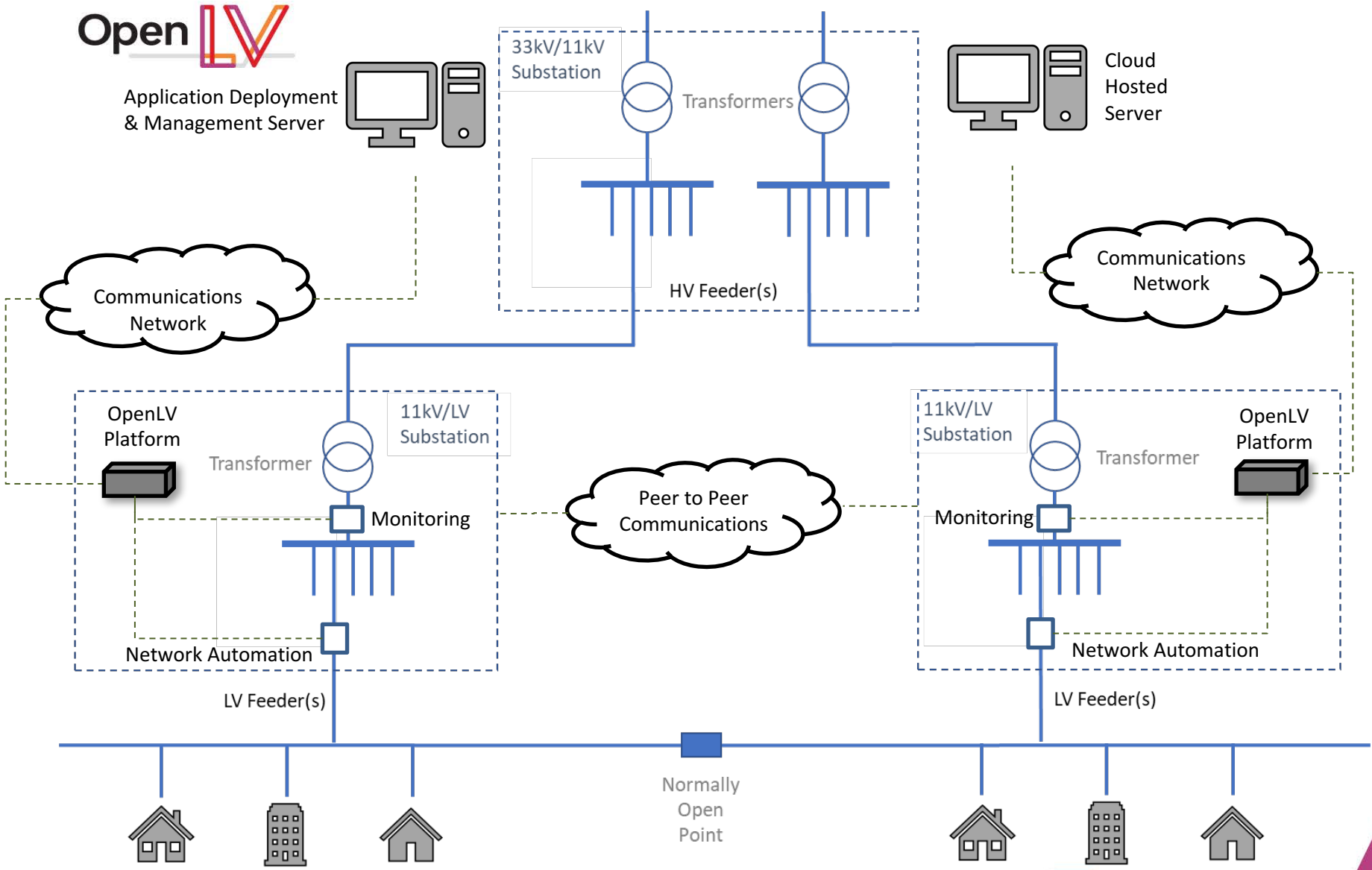
Open LV

The concept

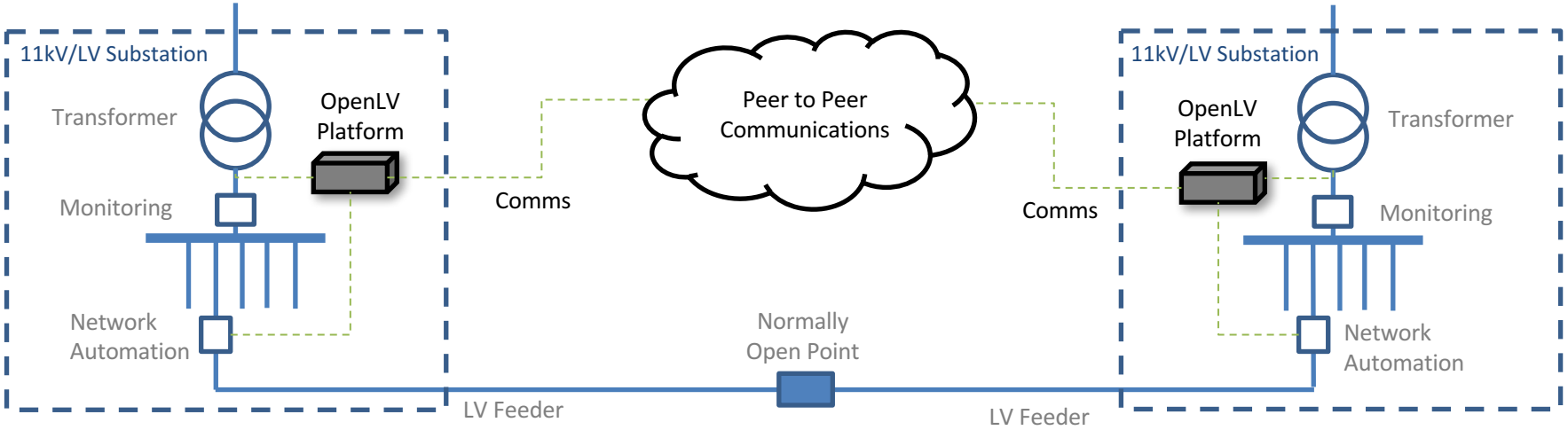




Systems Architecture



Releasing additional capacity



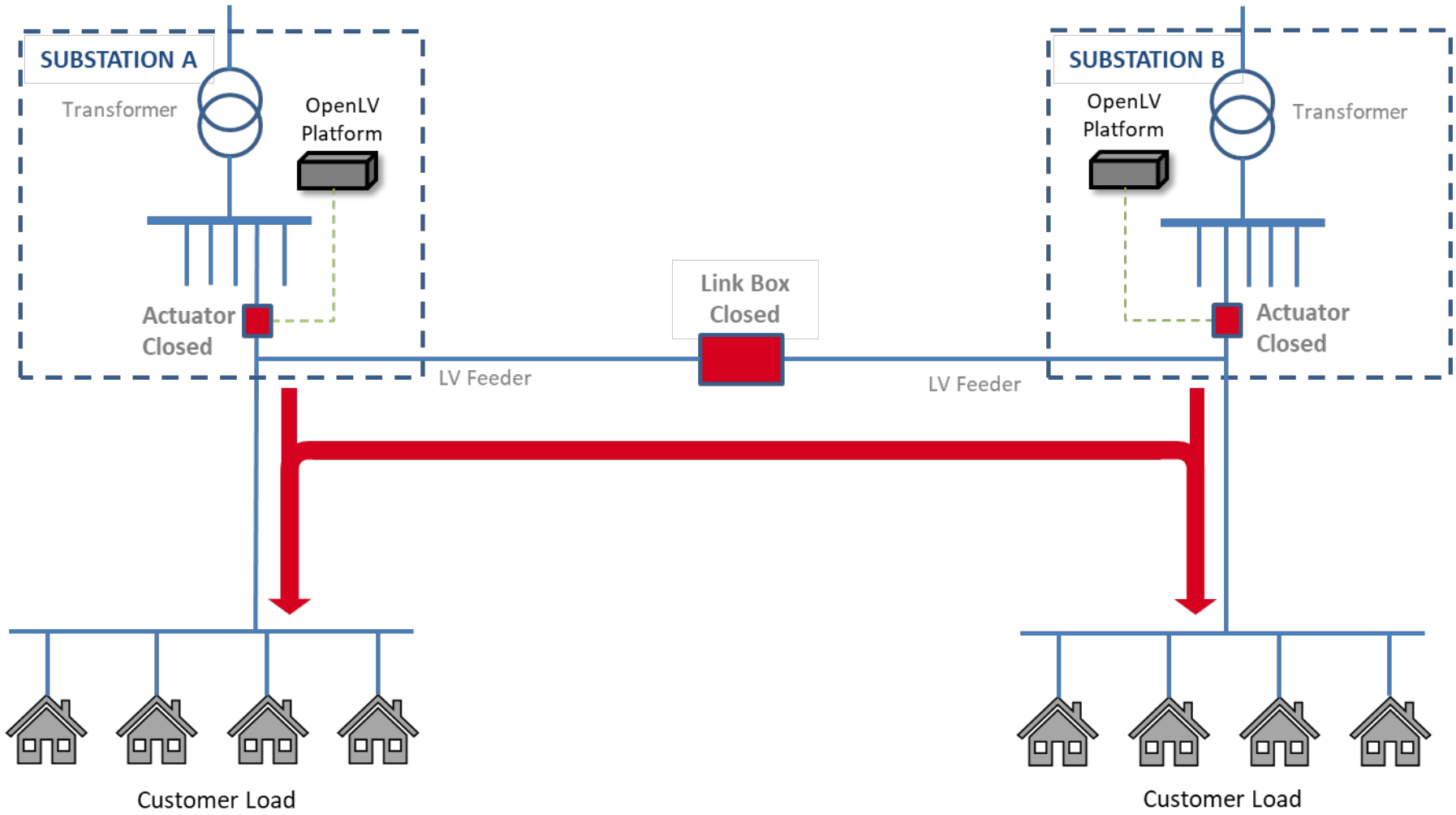
What

- Check network capacity against RTTR of transformer; when breached, close two radial circuits to mesh the LV network
- Deploy two proven techniques
  - 'Dynamic Thermal Ratings app' and
  - 'Network Meshing app'

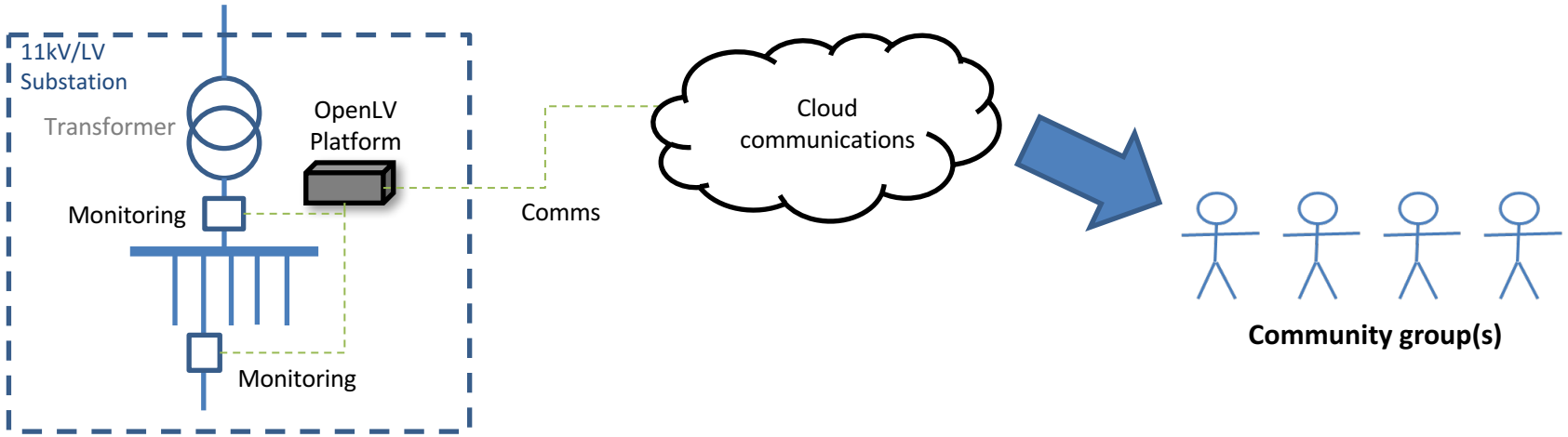
How

- Assess WPD's network to identify candidate circuits
- Target a range of LV networks
- Deploy LV-CAP™ to 60 substations
- Deploy network automation to 10 substations (5 pairs)
- Monitor how the solution operates over the trial period
- Assess and report on performance

Meshing the network



Community engagement



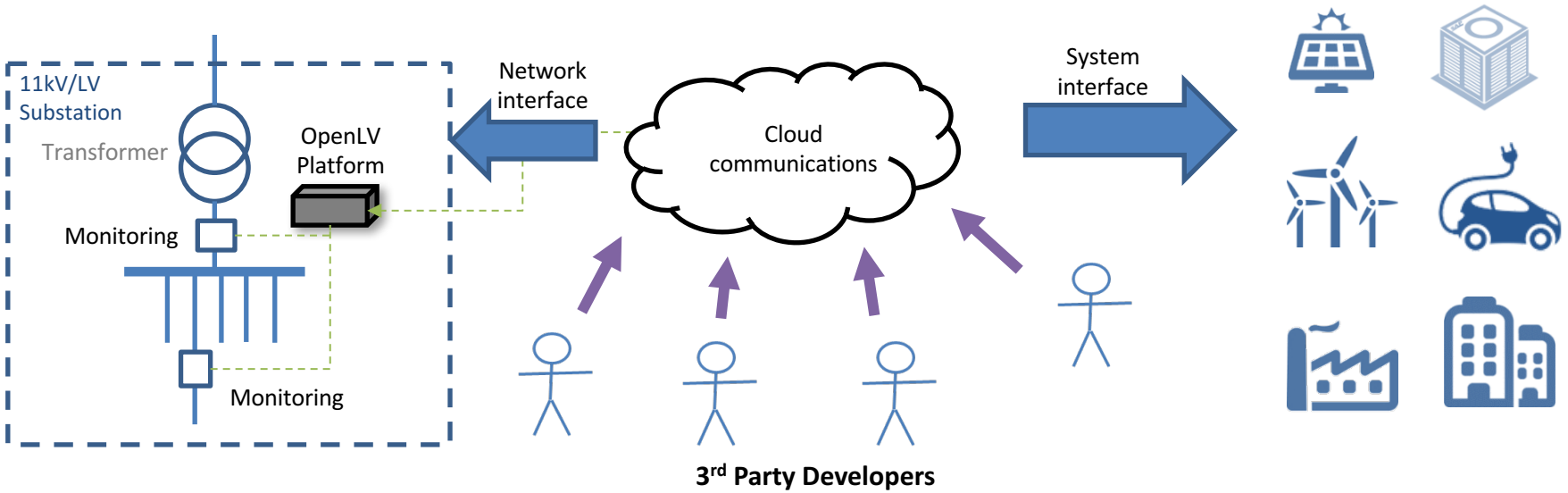
What

- To work with key community groups to understand whether apps can be developed and installed on the platform
- Identify funding sources that customers / communities can use to develop specific apps

How

- Community engagement to promote availability of platform / LV network data
- Make available 10 LV-CAP™ units for deployment
- Funding to develop specific apps to be raised outside of the project budget, e.g. public funding / private sector

Business & Academia



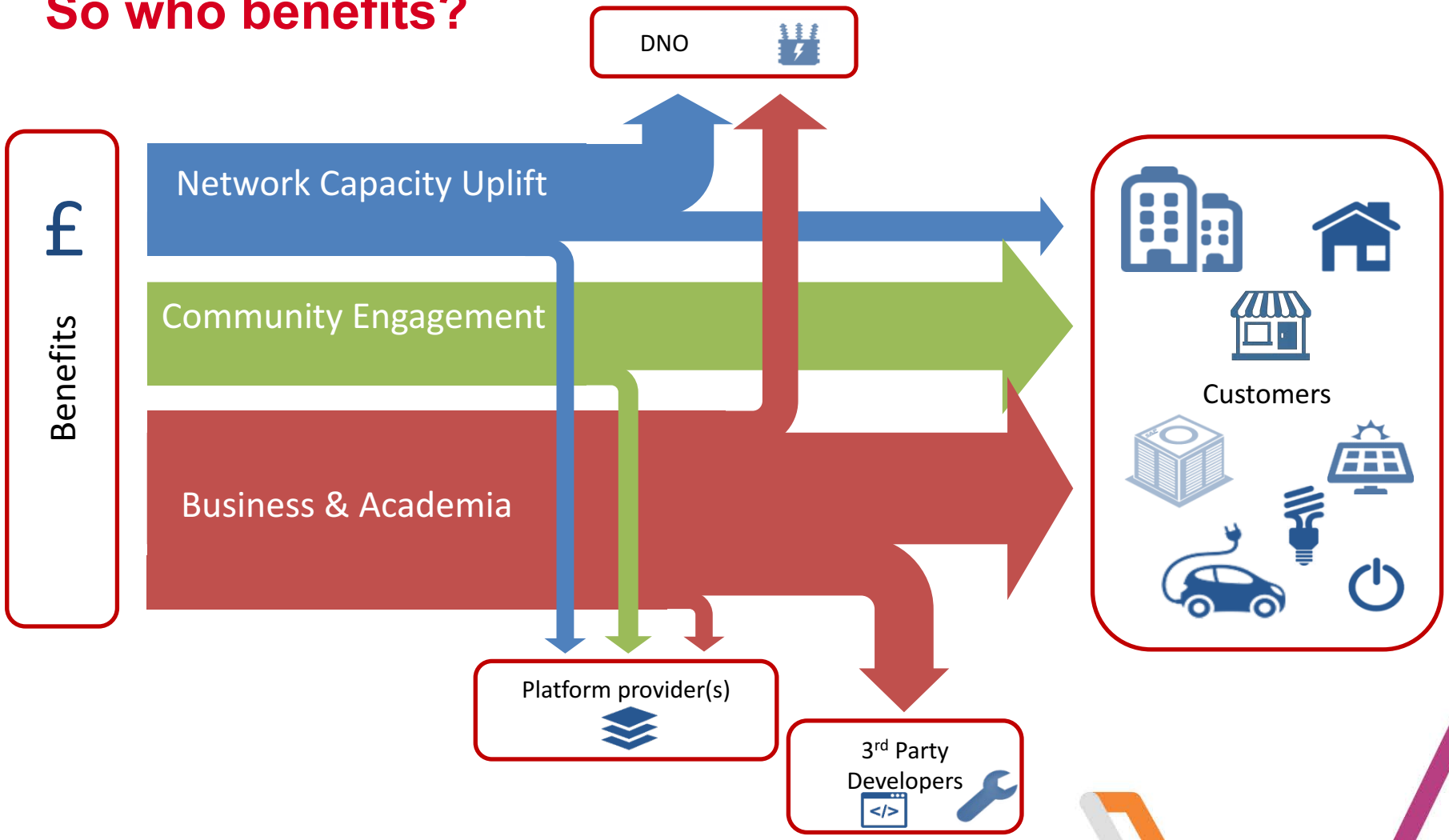
What

- To enable companies to develop innovative algorithms and applications for either the DNO, or its customers

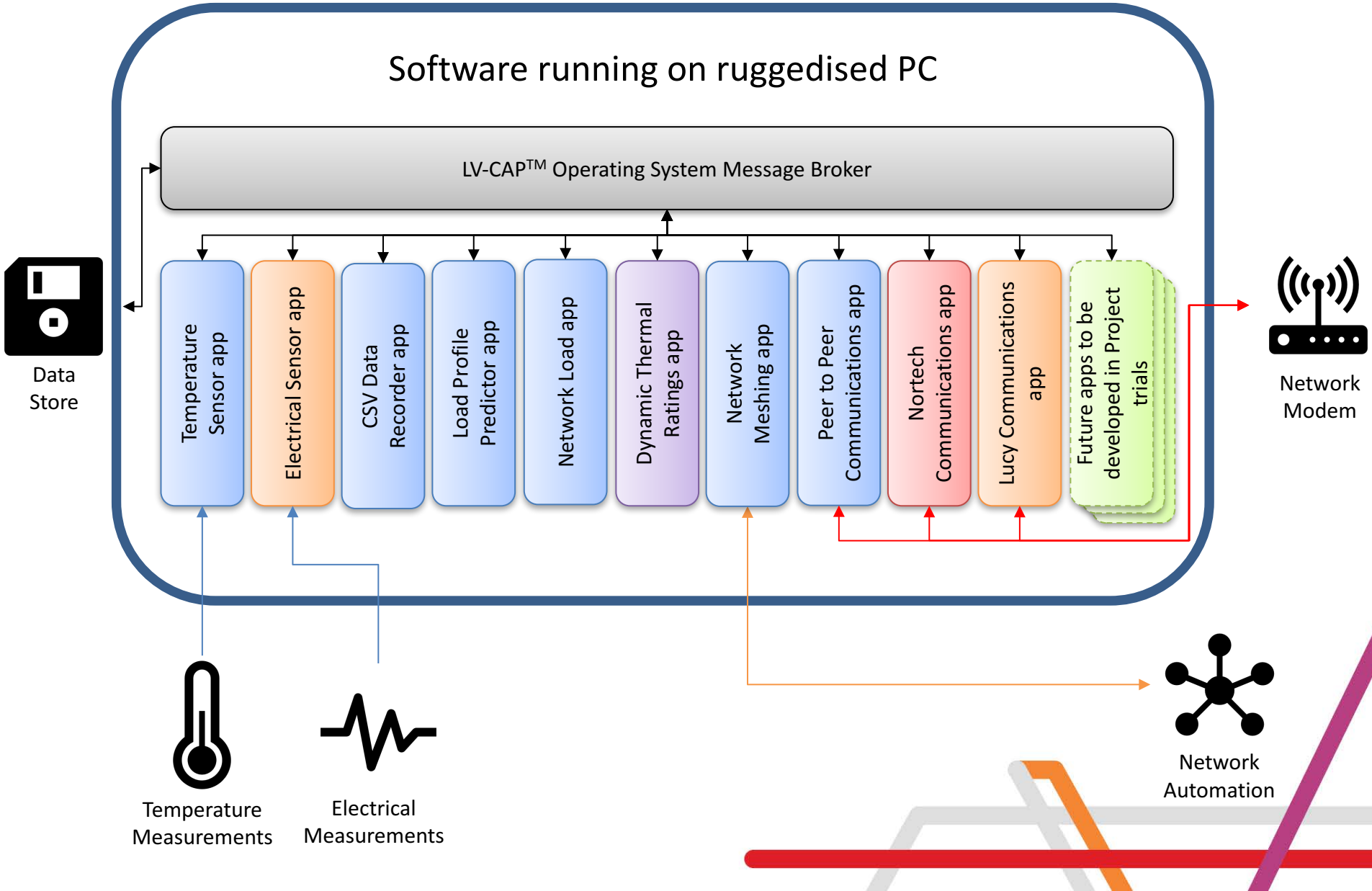
How

- Publicise the opportunity to 3rd parties
- Make available 10 LV-CAP™ devices for substation deployment
- Funding to develop specific apps to be raised outside of the project budget

So who benefits?



The star of the show



The hardware

Ruggedised PC

Network Modem

Network Automation Isolation switch

Padlock hasp

When are we doing it…?

- Phase 1 Mobilise & Procure
  - Set Up full Project Team (Jan-17 to Jul-17)
- Phase 2 Design & Build
  - Central Infrastructure (Mar-17 to Sep-17)
  - Initial Field Tests (Oct-17 to Jan-18)
  - Hardware Available for All Methods (Dec-17)
- Phase 3 Trial, Consolidate & Share
  - Project Trial Period (Mar-18 to Jun-19)

Core deliverables

1: **Specification, design and Factory Acceptance Testing** of the overall Solution (Oct-17)

2. **Detailed trial design** identification of target networks and assessment of market potential (May-18)

3. **Learning from deployment** of the Solution & standard guidelines for app development (Feb-19)

4. **Learning from the project trials** (Jan-20)

5. **Knowledge capture, dissemination & transfer to Business as Usual** (Apr-20)

Key achievements to date

- **Commercials:** Complete
- **Customer Engagement Plan:** Complete
- **Data Protection Strategy:** Complete
- **6 Month Project Progress Report:**
  Delivered in June
- **Trial equipment:** Test units built
- **Acceptance Testing**: On-going
- **Marketing & PR:** Website live
- **Trial Recruitment:** We are open for business!

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Engaging with communities

Rachel Coxcoon, CSE

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10 LV-CAP™ devices are available for deployment in WPD substations, for communities

Open LV

CSE's role in OpenLV

- Recruit and assist community groups to understand how best they can use LV data
- Support community groups to understand technical limitations and possibilities
- Support community groups to develop app proposals
- Secure funding for programmer time
- Support communities in deployment and testing

Initial survey to community groups – our approach

- The OpenLV project is making electricity network data ‘open access’ for the first time ever, inviting innovation from within communities themselves.
- CSE issued a survey to its stakeholder community database June 2016.
- The survey was open for one month.
- 51 complete responses received (3 outside WPD area)
- Good spread across WPD licence areas
- Majority from community energy groups (34), of which 22 own generating assets

Response to 'pre-formed' app ideas given in survey

	Very interested	Neutral	Not interested	Total
Understanding community electricity demand	92% (44)	6% (3)	2% (1)	48
Connecting low carbon technologies to the LV grid	91% (43)	9% (4)	0% (0)	47
Community alerts to request reduction or increase in electricity usage	72% (34)	19% (9)	9% (4)	47
Demand side response for managed electric vehicle charging	63% (30)	31% (15)	6% (3)	48
Community information alerts	66% (29)	34% (15)	0% (0)	44
Automated electricity storage control	56% (27)	38% (18)	6% (3)	48

Survey results

46 high-level app ideas proposed in addition to interest in pre-formed ideas, including:

- "*CO_2 energy production - when is it best to use low CO2 energy?"*
- *"We have installed 414 kW of rooftop PV in our community and are interested in knowing how its output hour by hour relates to demand in our agricultural area."*
- *"It would be interesting to be able to correlate with wholesale prices, i.e. how much effect renewable generation is having on wholesale and triad prices"*
- *"Neighbourhood planning; measuring data to drive low carbon city/carbon reduction, addressing fuel poverty."*

Next steps with community groups

- 2- stream Expression of Interest process – community energy groups and those with no energy background (opens November)
- 4 finalists selected by Feb/March, then supported community consultation events to bring in wider participation.
- App design workshops with key community members – May – June 2018
- App development phase – June – September 2018
- Trial – September 2018 – June 2019

Issues to bear in mind if you're thinking of applying...

- **Timetable** – trial timetable is only 10 months and there is limited time for baseline data collection. Apps that need months of baseline data before design and development unlikely to be successful.
- **Geographic scale** – only 10 LV-CAP™ units available. Even small villages might have 5-7 substations. What can be achieved with 3 kits in your area?
- **Who benefits?** - apps that create private benefit but little community buy-in won't be successful, nor those that are unlikely to lead to network efficiencies if rolled out.

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Engaging with business and academia

Gill Nowell, EA Technology

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10 LV-CAP™ devices are available for deployment in WPD substations, for business and academia

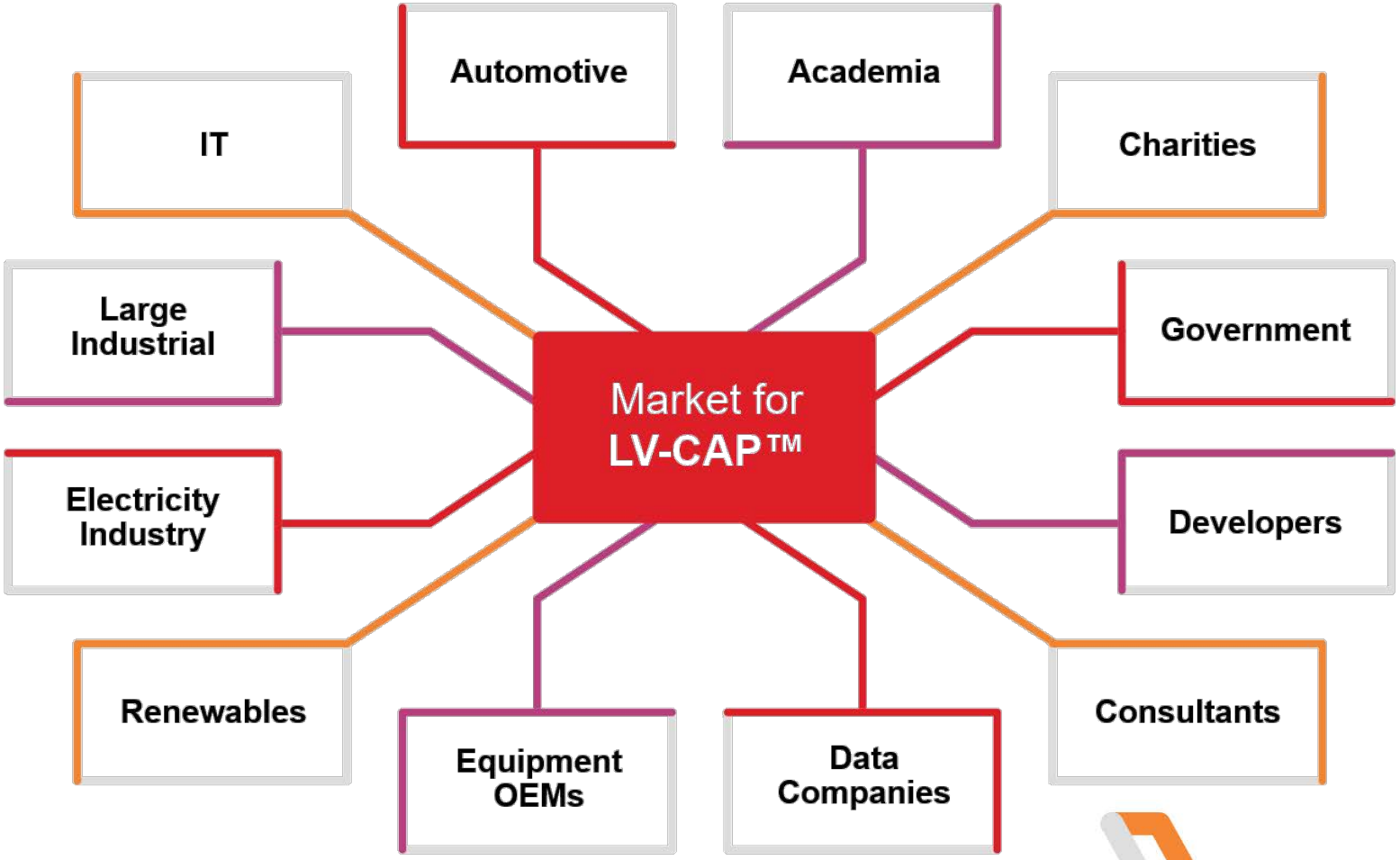
Engagement approach

To enable companies to develop innovative algorithms and applications for either the DNO, or its customers

- Strategic approach to publicise the opportunity to business and academia
- Make available standard app ‘container’ for third parties to use for their development
- Make available 10 LV-CAP™ devices for substation deployment
- Funding to develop specific apps to be raised outside of the project budget, e.g. private sector

- >30 organisations have indicated interest already

Stakeholder groups



Survey to register interest

- Emailed to 900 stakeholders
- Circulated via project team's networks and newsletters
- Twitter @OpenLV_ & LinkedIn
- PR issued to energy / electricity, renewables, I.T. media
- 30+ interested parties
- All information treated as confidential

Survey link:

https://openlv.net/about/the-project/for-business-and-academia/

Business and academia engagement process

- Step 1: Register your interest by completing the survey (16/10/17)
- Step 2: Engage with OpenLV team (10/17 – 01/18)
- Step 3: Successful applicants notified that an LV-CAP™ device is available for use with their app / electricity data use purposes (01/18)
- Step 4: App development (02/18 – 07/18)
- Step 5: OpenLV trials commence – apps tested on the LV-CAP™ platform (09/18)
- Step 6: OpenLV trials close (07/19)

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OpenLV – the movie

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Get involved in OpenLV

www.openlv.net/

@OpenLV_

OpenLV@eatechnology.com

Thank you

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The concept – open access to electricity usage data and the opportunity to develop apps