SERL project summary

Simon Elam
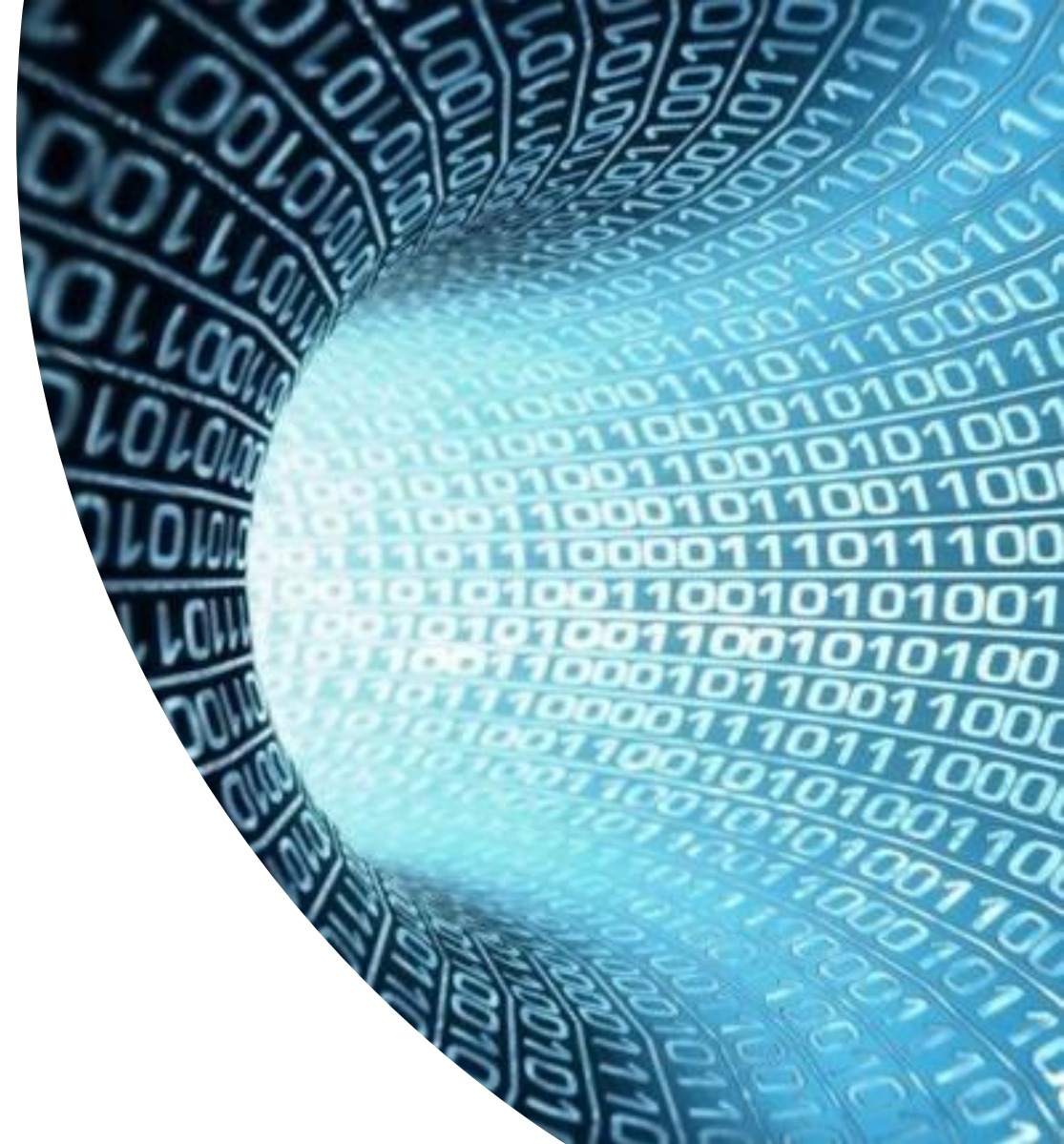
Director of the Smart Energy Research Lab

SERL Vision

The **Smart Energy Research Lab (SERL)** will

- Provide a secure data portal for UK researchers
- Grant access to high-resolution energy data
- Facilitate innovative energy research for years to come

Complemented by

- SERL's multi-disciplinary research programme

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**Project Duration**: 5 Years (Aug 2017- August 2022) **Funding**: £6m

Funded by

EPSRC
Engineering and Physical Sciences
Research Council

Consortium partners

energy saving trust

Loughborough University

THE UNIVERSITY of EDINBURGH

UCL

UNIVERSITY OF Southampton

CARDIFF UNIVERSITY
PRIFYSGOL CAERDYLD

LBU LEEDS BECKETT UNIVERSITY

University of Essex

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Why do we need SERL?

- Historically, and currently, very difficult for researchers to access good quality, demand-side energy data in the UK

- Smart meter data should be a game-changer – high resolution (HH) data

- However substantial barriers to accessing smart meter data
  - Technical
  - Legal
  - Financial

- Hence SERL funded to be a **central resource** for the UK research community

- SERL's focus is on enabling research investigating energy demand/consumption etc in domestic buildings
  - requires use of granular, household level energy data – which is personal data (GDPR) and could be disclosive hence Secure Lab setting
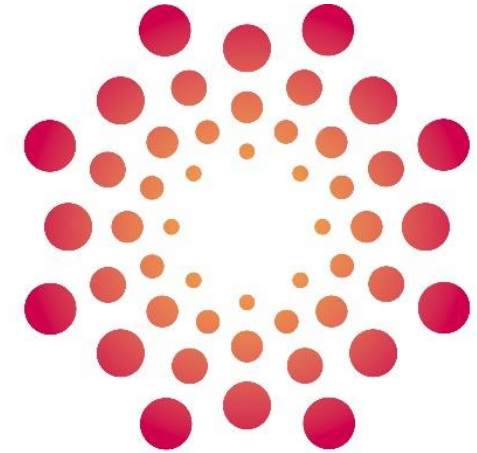
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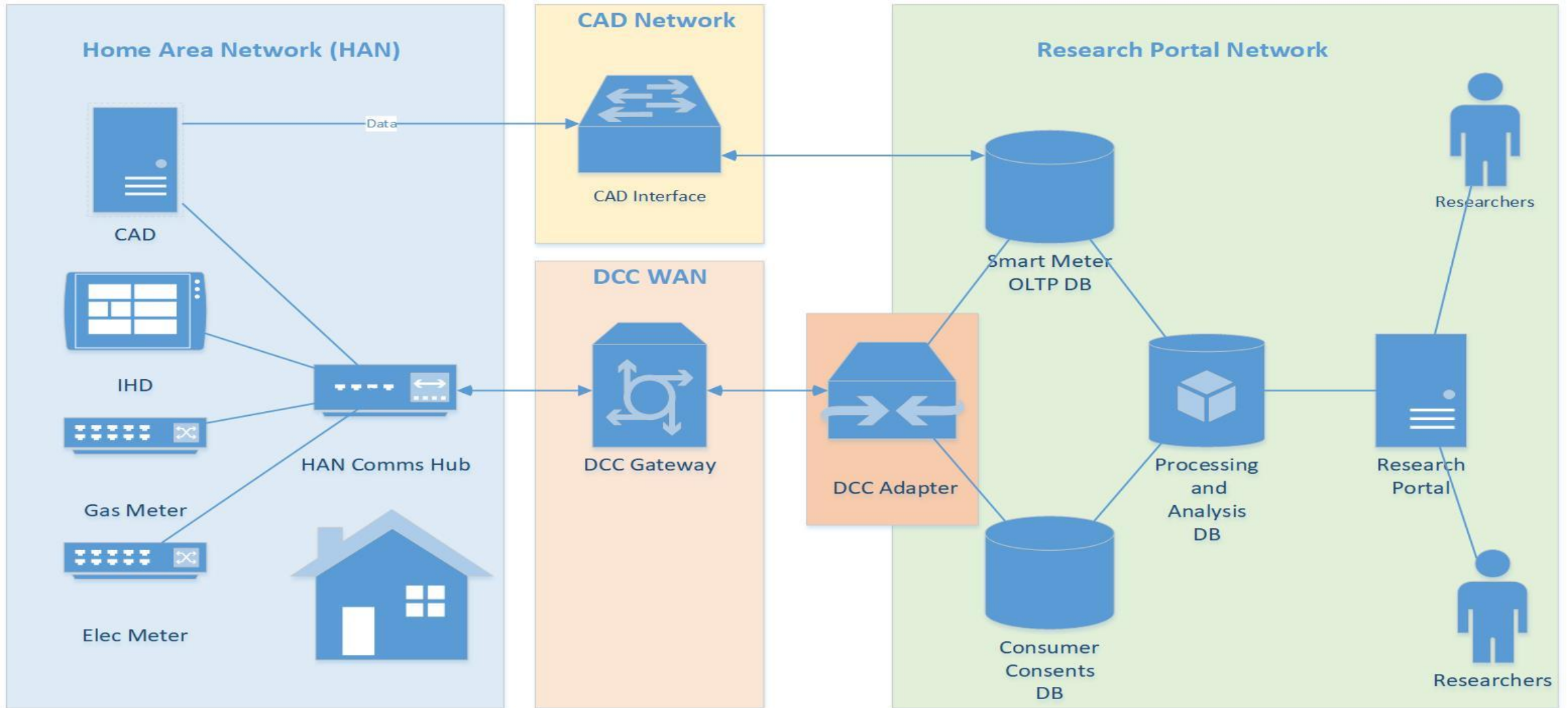UNIVERSITY RESEARCH FOR PUBLIC GOOD

SERL Data

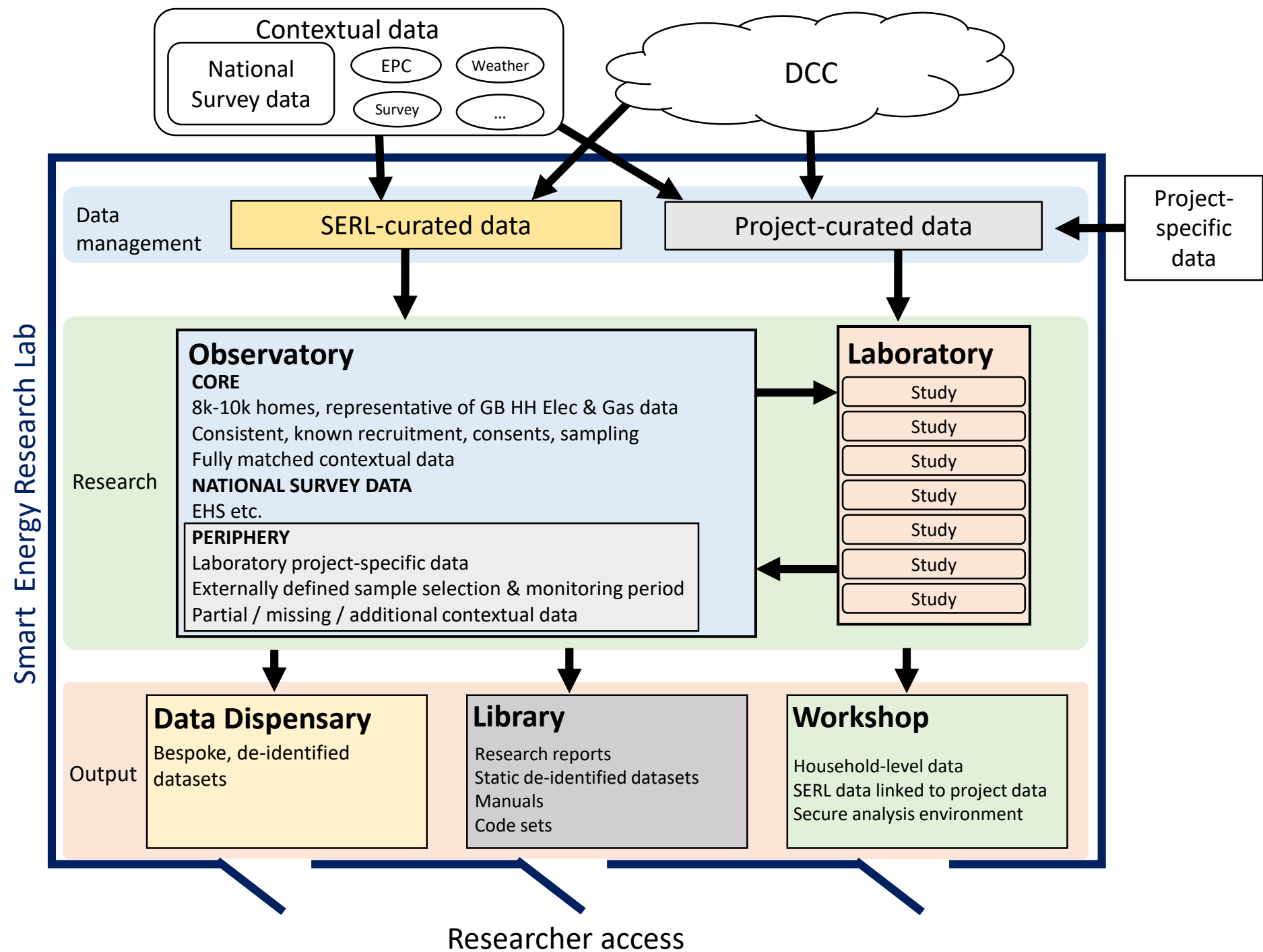Pseudo-anonymised household-level data:

- Smart meter data
  - Longitudinal daily and half-hourly energy (electricity and gas) consumption data
    - Historic – previous 12 months from point of consent
    - Ongoing – until participant withdraws consent or change of tenancy etc
  - tariff data
  - additional smart meter technical data
- Contextual data
  - a short SERL survey completed by participant households
    - household information
    - Building characteristics
  - Energy Performance Certificate (EPC) data
  - weather data

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SERL System Diagram

SERL Research Design Framework

Contextual data
- National Survey data
- EPC
- Weather
- Survey
- ...

DCC

Project-specific data

Smart Energy Research Lab

Data management

SERL-curated data

Project-curated data

Research

Observatory

CORE
8k-10k homes, representative of GB HH Elec & Gas data
Consistent, known recruitment, consents, sampling
Fully matched contextual data

NATIONAL SURVEY DATA
EHS etc.

PERIPHERY
Laboratory project-specific data
Externally defined sample selection & monitoring period
Partial / missing / additional contextual data

Laboratory
- Study
- Study
- Study
- Study
- Study
- Study
- Study

Output

Data Dispensary
Bespoke, de-identified datasets

Library
Research reports
Static de-identified datasets
Manuals
Code sets

Workshop
Household-level data
SERL data linked to project data
Secure analysis environment

Researcher access

Examples of SERL-facilitated Research

SERL Research Programme

- The short and long-term impact of COVID-19 on building energy demand and future decarbonisation (UCL/CREDS)

- Identifying wintertime comfort in UK homes (Leeds Beckett University)

- SERL annual report (University College London)

- Understanding habitual energy consumption (University of Southampton)

- Domestic Operational Rating (DOR): Development, Programming and Testing (Loughborough University)

- Understanding domestic building thermal efficiency with smart meter data (UCL)

Examples of other potential research (e.g. your project?):

- How do socio-demographic factors impact demand profiles?

- Identification, targeting and mitigation of fuel poverty

- Distributional impact of switching suppliers/tariffs on bills and energy consumption

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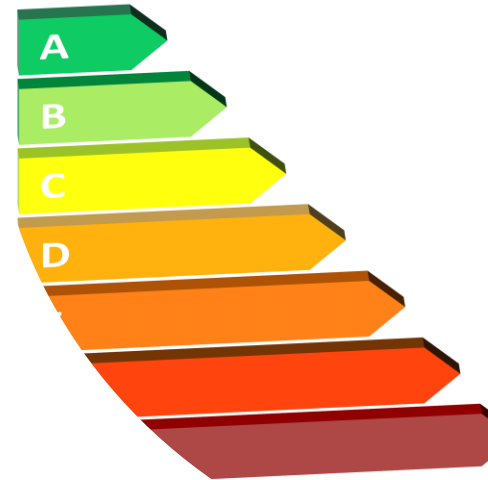
Participant Recruitment

Observatory

- We aim to recruit 8-10k participants (households) to our core Observatory panel by the end of 2020
  - Representative of GB households
- Pilot Phase conducted in Aug-Sept 2019
  - Stratified random sample households with SMETS2 meters
  - Over 1700 households recruited
- Two further waves of participant recruitment in 2020
  - Wave 2 (4k participants) – Aug/Sept
  - Wave 3 (4k participants) – Oct/Nov

Laboratory

- Laboratory projects recruit their own participants and include consent for SERL to collect data

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Data Governance

Robust Data Governance is absolutely fundamental to the development and operation of the SERL research portal

- **Inbound governance** - Data collected by SERL via informed consent from participants (GB households). Full compliance with the Smart Energy Code (SEC) and GDPR.

- **Outbound governance** - ensures that only projects approved by SERL's Data Governance Board can access data via a Secure Lab using "5 Safes" protocols.

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Accessing SERL data – 5 Safes

Accessing SERL data via a Secure Lab environment:

- safe people - all researchers must obtain ONS Accredited Researcher status

- safe projects – all projects must be approved by SERL DGB

- safe settings – UKDS Secure Lab / SERL research portal

- safe data – appropriate for secure lab environment e.g. pseudo-anonymised

- safe outputs – via Statistical Disclosure Control

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SERL Data Provisioning

Researcher datasets

- Regular updates (monthly/quarterly)
- Robust data Quality Assurance before release
  - Data QA report, data quality flags/scores, derived variables
- Exploratory Analysis dataset
  - First release – June 2020
  - Second release – July 2020
    - smart meter data (Jan 2019 to June 2020)
    - Linked to contextual data (survey, EPC, weather)

SERL Secure Lab environments

- UKDS Secure Lab – available now
- SERL Research Portal (beta) – currently in Test
- SERL Research Portal – available in Aug/Sept 2020

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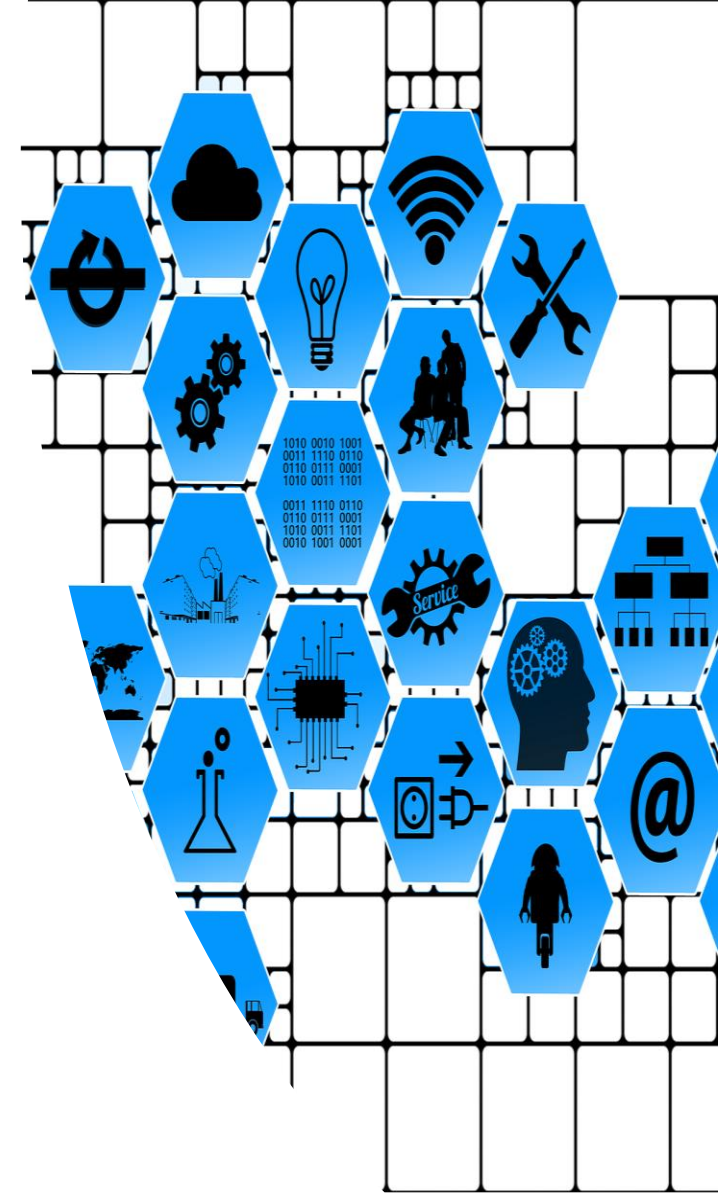
Where are we now (Q2 2020)?

- We have established:
  - Technical infrastructure:
    - DCC Adapter service
    - Participant Portal
    - Data ingest and management processes
  - Data governance framework and DGB
  - SERL research programme – 6 projects commissioned
- SERL is now a **live project**
  - Data from 1,700 households (Pilot Phase)
  - First dataset published via UKDS
- **Next steps**
  - Participant recruitment – two more waves in 2020
  - Research Portal – Q3 2020
  - SERL research programme – research continuing
  - SERL DGB – **reviewing research project applications – please apply!**

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More information and accessing SERL data

Accessing SERL data

- Once the permanent data collection is released we **welcome research project applications to use SERL data.** Information on the process:
  - **SERL - https://serl.ac.uk/researchers/**
  - UKDS - https://www.ukdataservice.ac.uk/use-data/secure-lab.aspx

SERL data via UKDS - see catalogue records:

- Exploratory Dataset (SN 8643)
  - https://beta.ukdataservice.ac.uk/datacatalogue/studies/study?id=8643#!/details

- Permanent Collection (SN ????)
  - Expected release in August 2020

SERL Contact Details:

website: https://serl.ac.uk/

email: info@serl.ac.uk

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- There are over 30 members (co-investigators and researchers) of the SERL Consortium across 8 organisations who have contributed to the development of SERL.
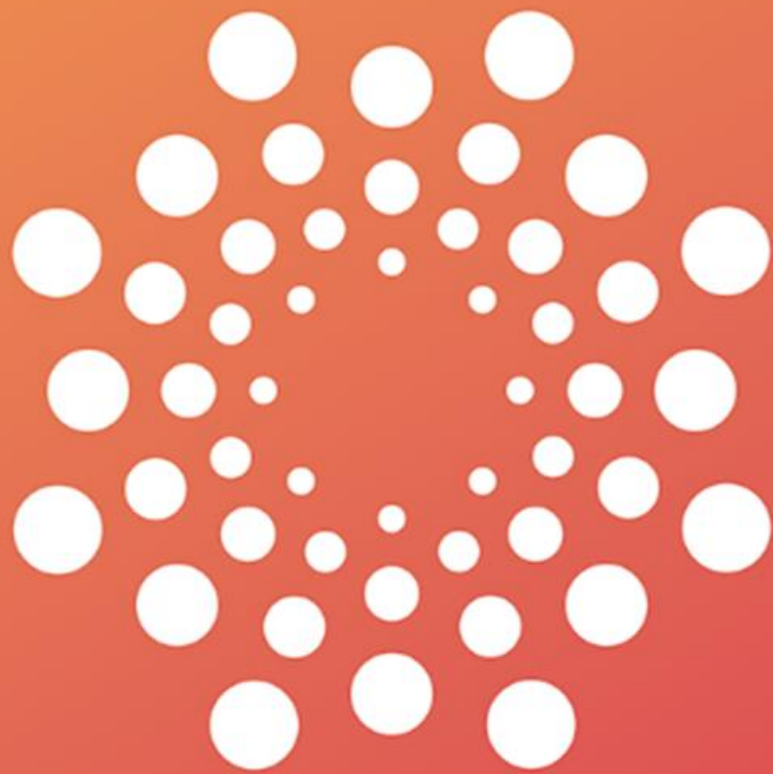
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