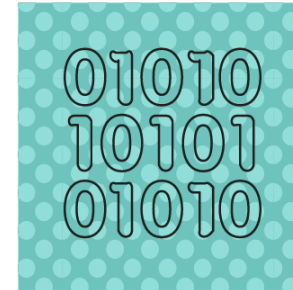


# New Tech: New Opportunities



Thursday 14 March 2019

# Agenda

- Introduction to Energy Systems Catapult
- New Tech
- Opportunities
- Being Prepared

# Introduction to Energy Systems Catapult

# What is Energy Systems Catapult?

**Mission:** Unleash innovation and open new markets to capture the clean growth opportunity

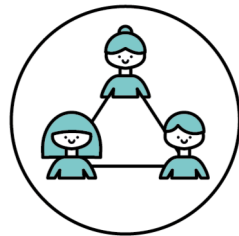
**170** Innovation experts



Hubs in Birmingham and Derby



Established and overseen by Innovate UK. Independent from Government. Not for profit



Bridge the gap between stakeholders in the sector

A place to develop and test new ideas



Supporting innovators



Research



Trials



Systems engineering

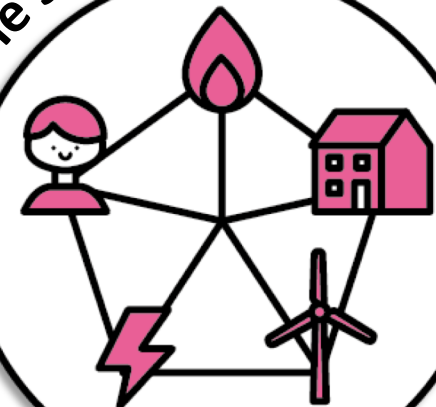


Digital



Modelling and simulation

We take a whole systems view





# About Energy Systems Catapult

## MISSION

Unleash innovation and open new markets to capture the clean growth opportunity

## WHOLE SYSTEM EXPERTISE AND APPROACH



Electricity



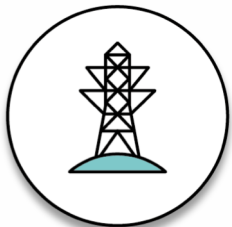
Heat



Transport



Industry



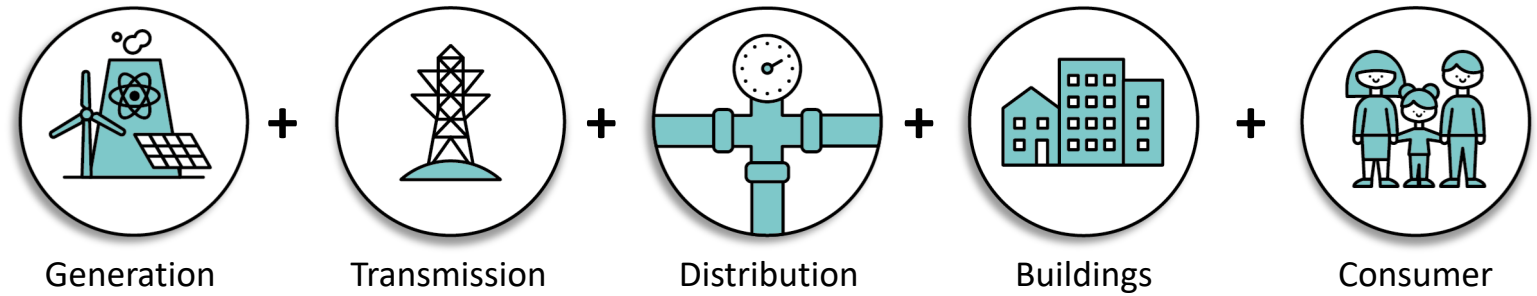
Infrastructure



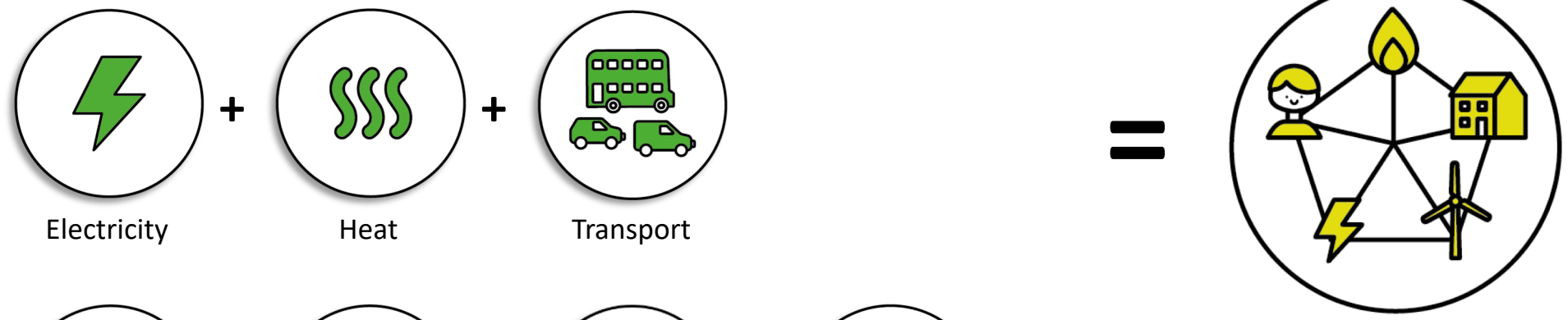
Consumer

# What is whole systems thinking?

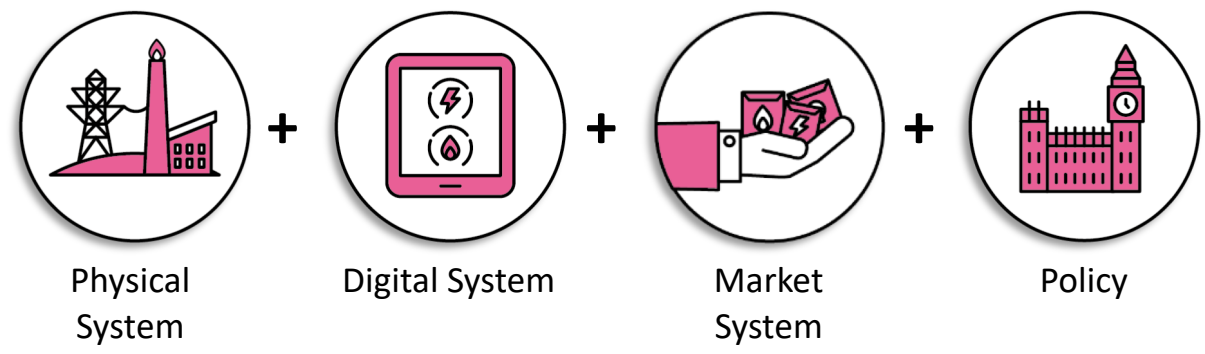
Joining up the system from sources of energy to the consumer



Breaking down silos between energy vectors



Joining up physical requirements of the system, with policy, market and digital arrangements



# Our capabilities and assets



## Modelling

National Energy System  
Modelling (ESME)  
Local Energy System Modelling  
Building Energy System  
Modelling



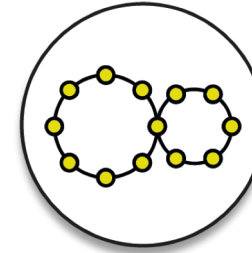
## Consumer Insight

Research  
Design  
Trials



## Digital

Home Energy  
Services Gateway  
Living Lab  
Data Science  
Data Systems  
Energy Knowledge  
eXchange™



## Systems Integration

Systems Engineering and  
Integration  
Business Model Innovation  
Dynamic Energy System  
Architecting and Simulation  
Energy System Integration Guides  
Future Power System Architecture  
Utility 2050



## Infrastructure and Engineering

Bioenergy  
Carbon Capture and Storage,  
Industry and Hydrogen  
Networks and  
Energy Storage  
Nuclear  
Renewables  
Transport



## Digital and Data

### Assets

#### Home Energy Services Gateway (HESG)



A cloud-based, technology agnostic platform, offering interoperability between device manufacturers and energy service providers enabling them to develop and test new products and service models in real homes.

#### Living Lab



Offers energy providers and product manufacturers access to rich consumer data by testing new products, services and business models in 100 real-world homes in Bridgend, Manchester, Newcastle and the West Midlands, all connected and controlled by the HESG digital platform.

#### Data Science



Developing advanced machine learning algorithms to deliver new energy service business models, and processing large volumes of data created by product and service trials.

#### Digital and Data Systems



Exploring how digital technologies and data can be used in the future energy system to help inform and shape the strategies and balance the complex risks associated with data privacy, data protection and cyber security.

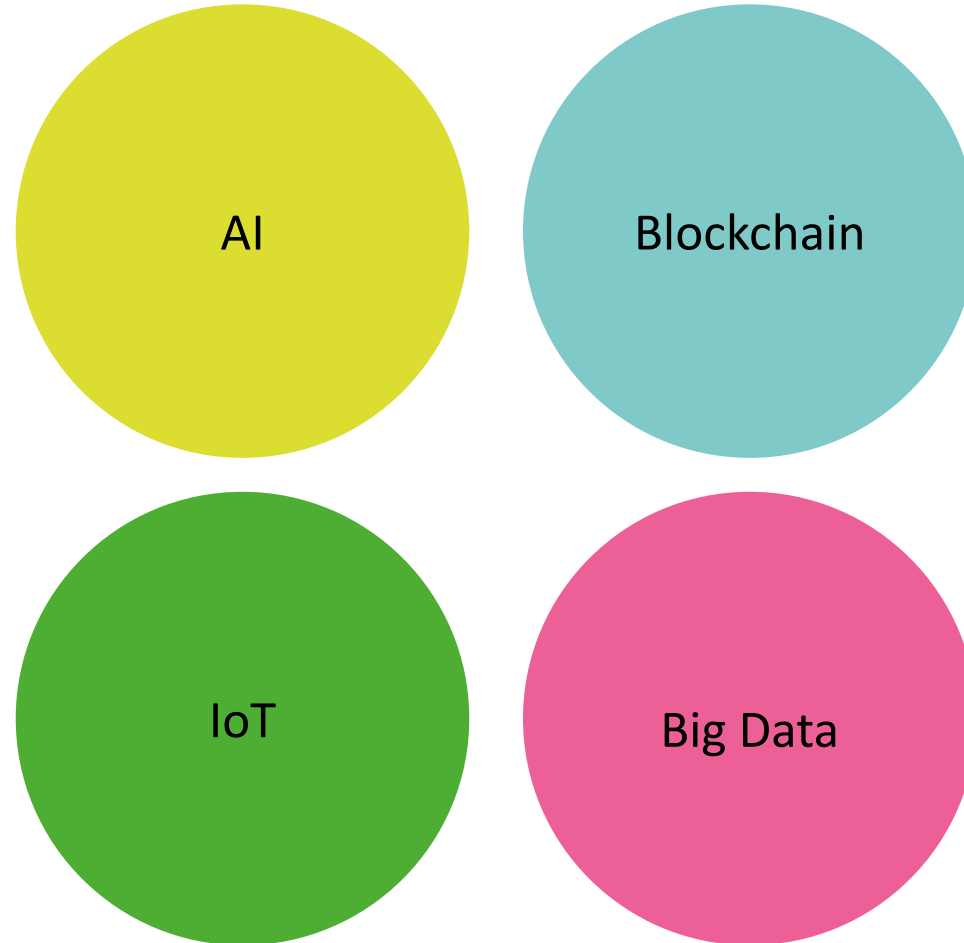
#### Energy Knowledge eXchange™



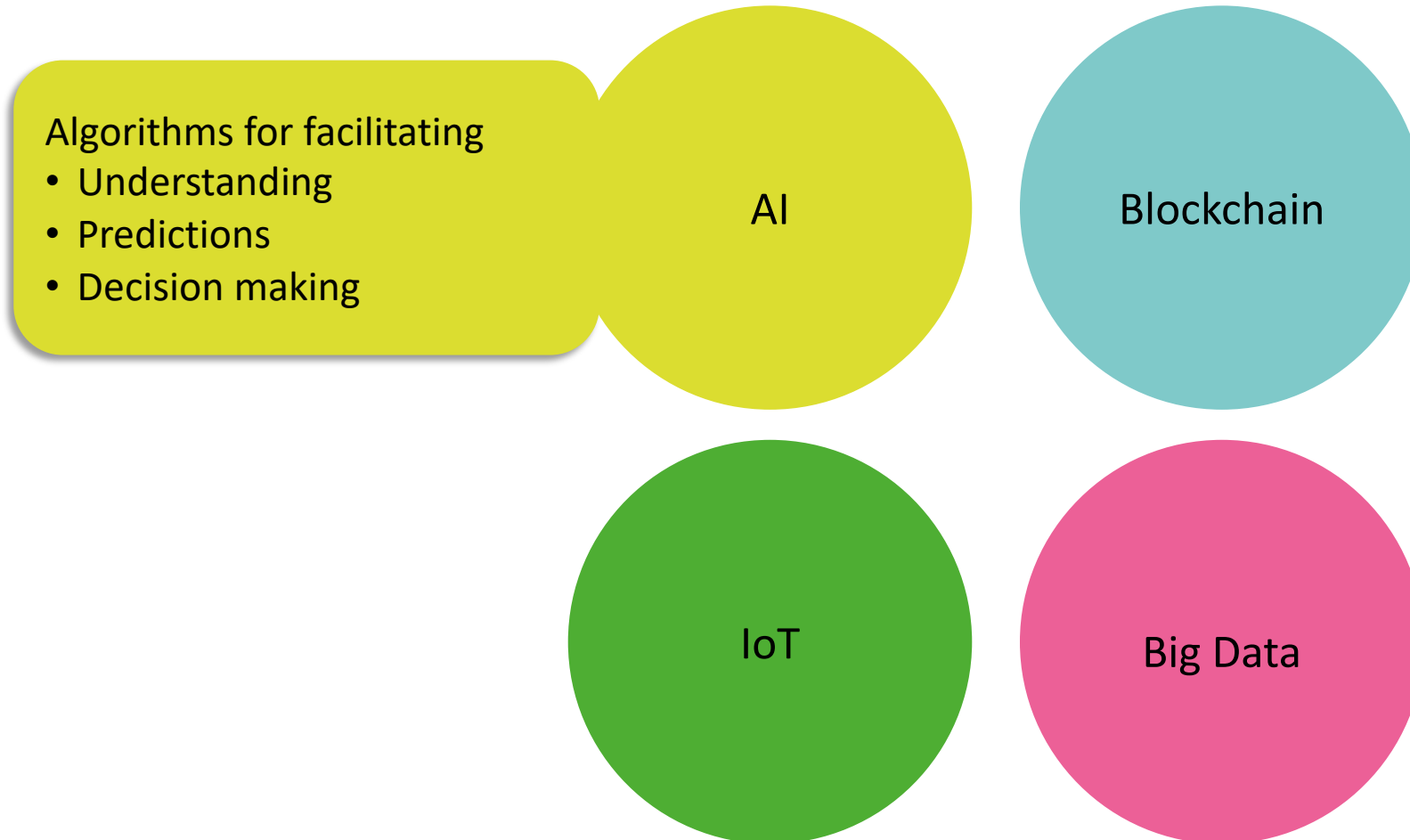
A free online collaborative service designed to meet the needs of energy innovators by signposting content on the web that can be hard to find, making knowledge more accessible.

# New Tech

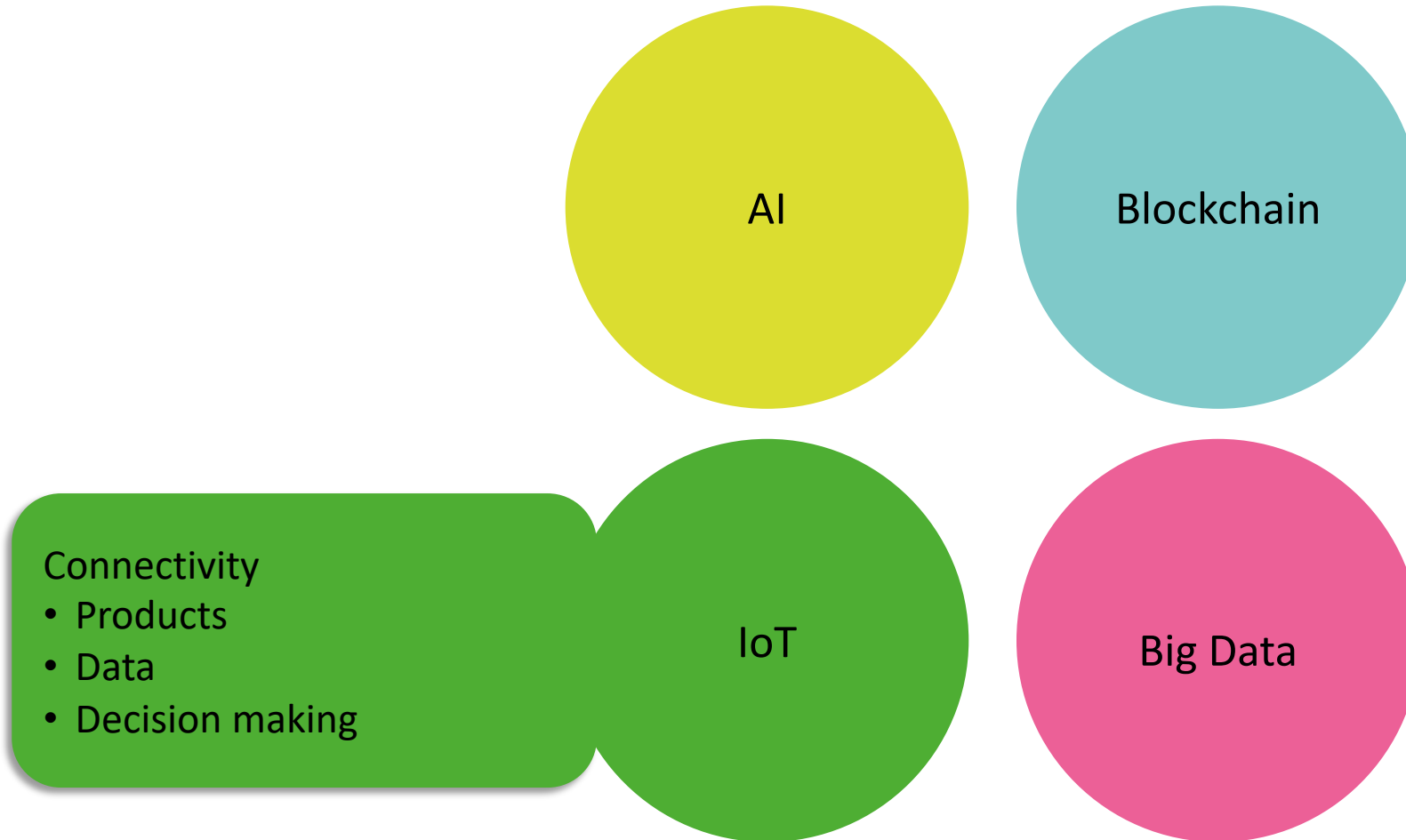
# New Tech - overview



# New Tech - overview

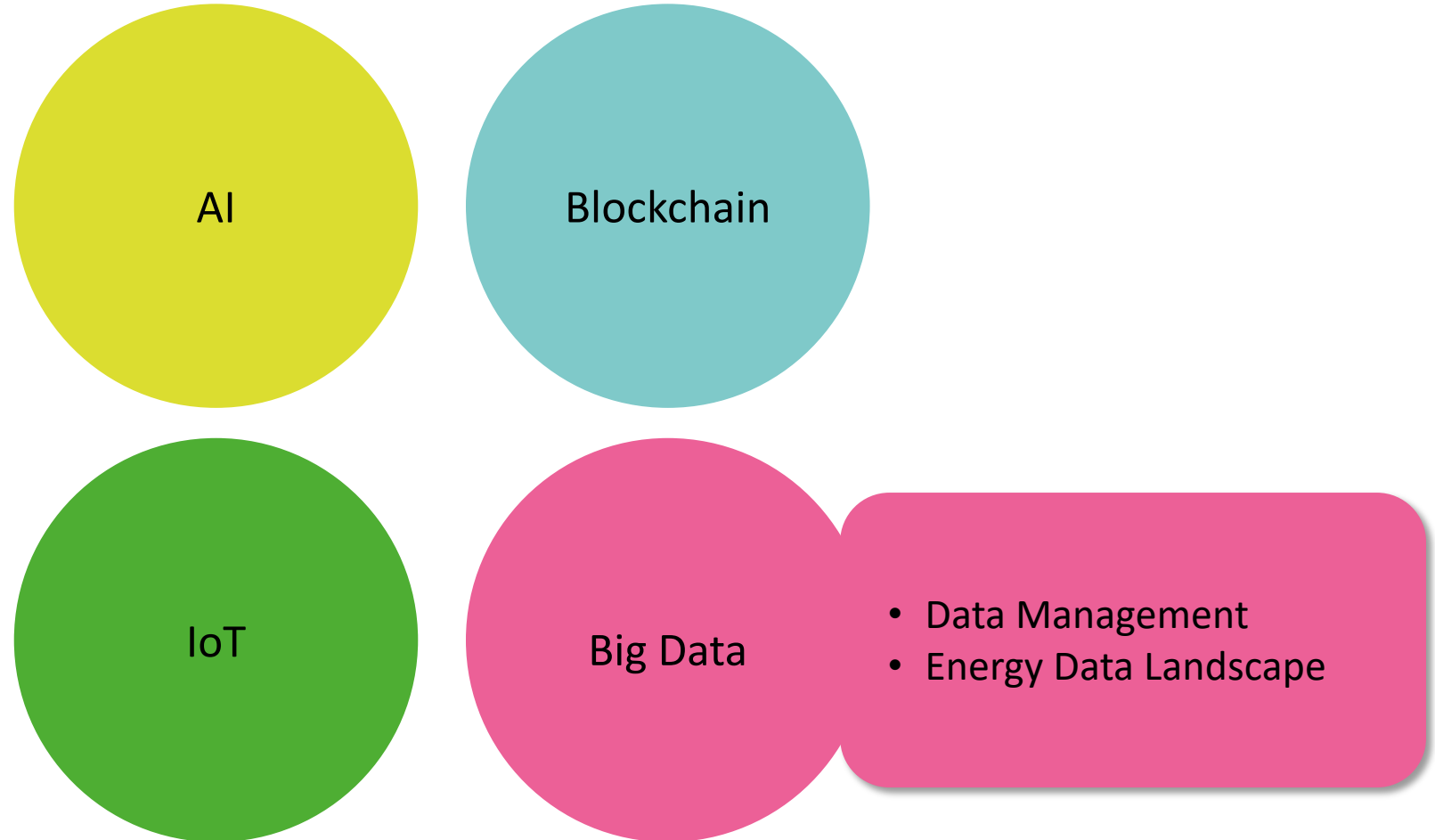


# New Tech - overview

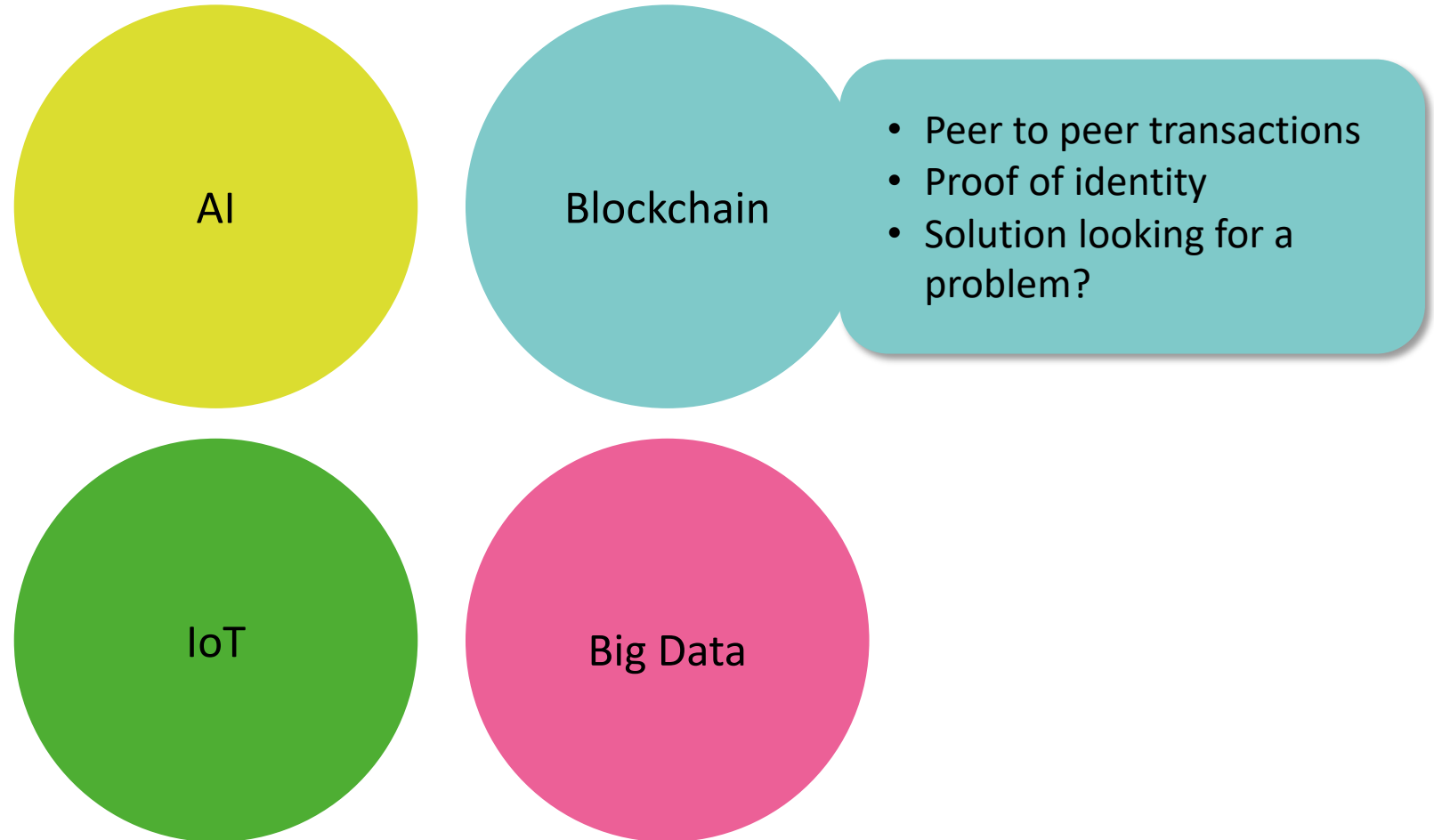




# New Tech - overview



# New Tech - overview



# New Tech - overview

## Algorithms for facilitating

- Understanding
- Predictions
- Decision making

AI

Blockchain

- Peer to peer transactions
- Proof of identity
- Solution looking for a problem?

## Connectivity

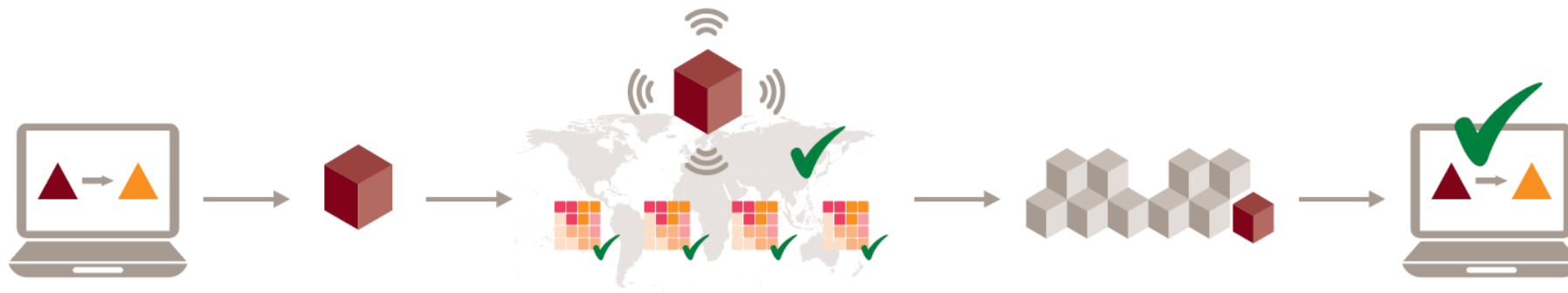
- Products
- Data
- Decision making

IoT

Big Data

- Data Management
- Energy Data Landscape

# Blockchain - details

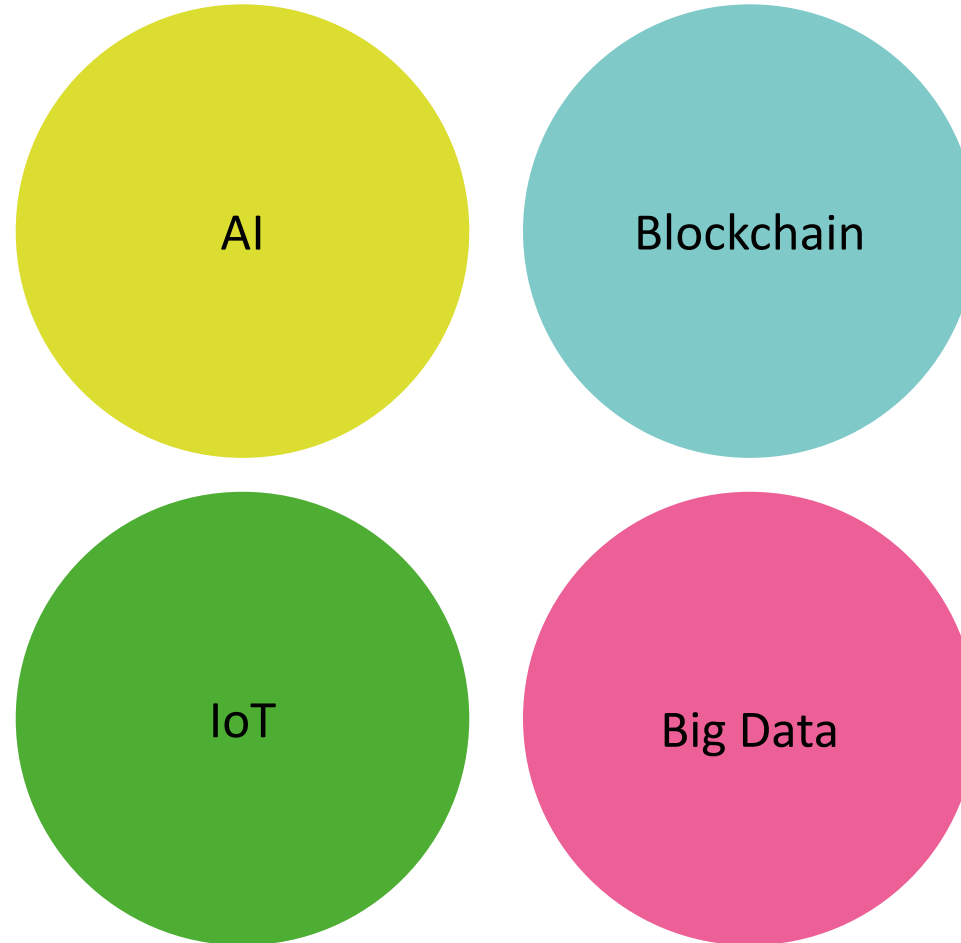


Source PWC Global Power and Utilities

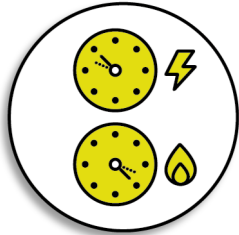
Blockchain

# Opportunities

# Opportunities



# Opportunities



Time of use  
optimisation  
e.g. storage and  
demand shifting.

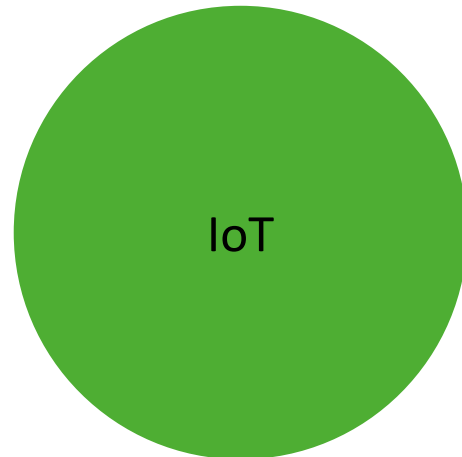
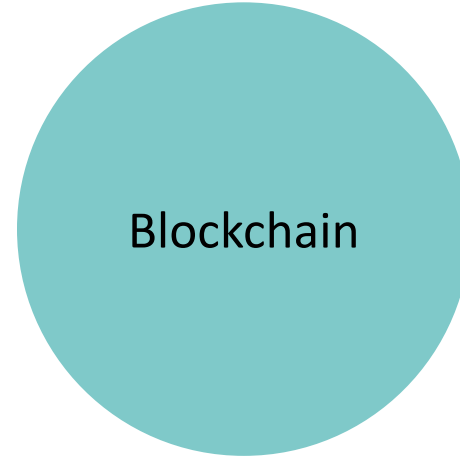
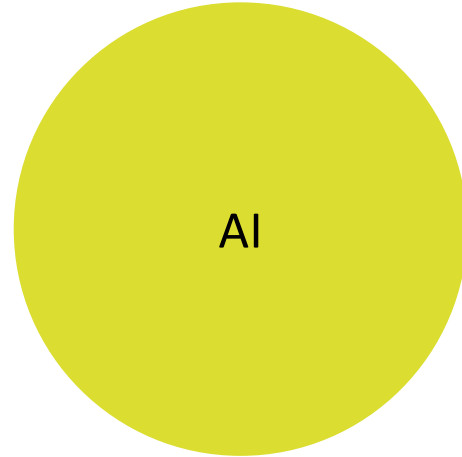
AI

Blockchain

IoT

Big Data

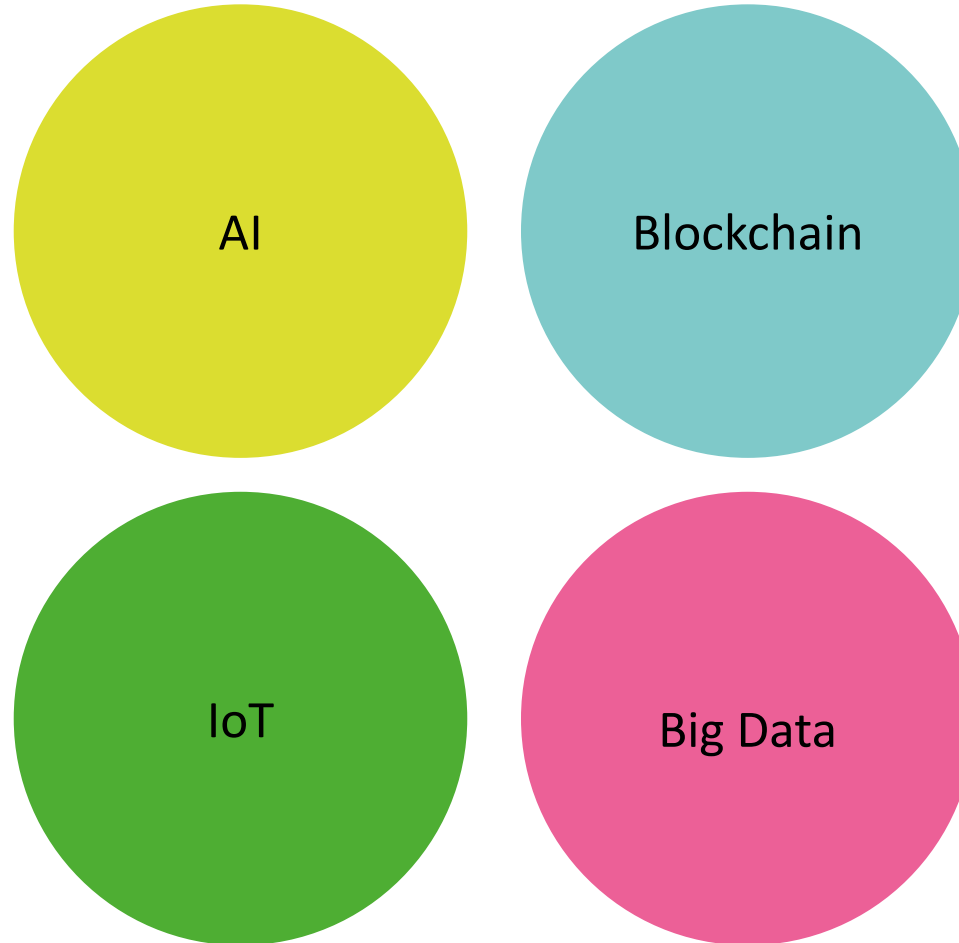
# Opportunities



Efficient  
Consumption  
e.g. home control  
systems.



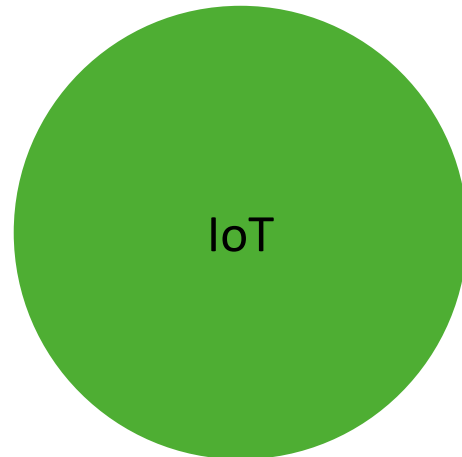
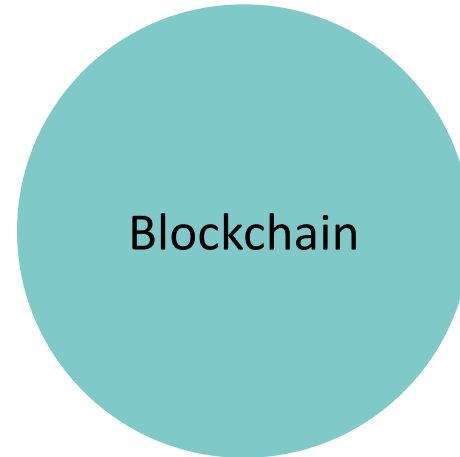
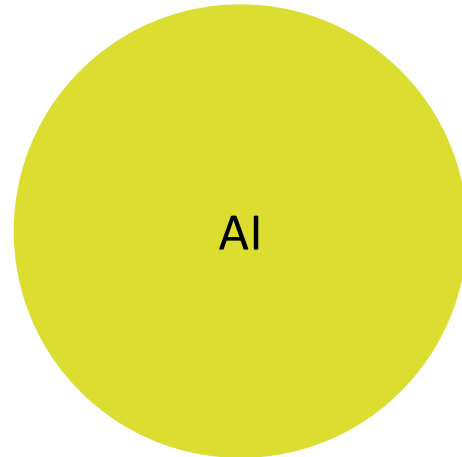
# Opportunities



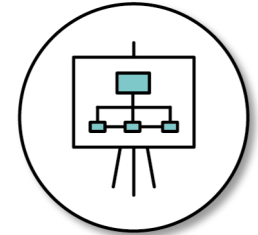
Energy as a service  
e.g. buying heat  
(comfort) rather  
than kWh's.



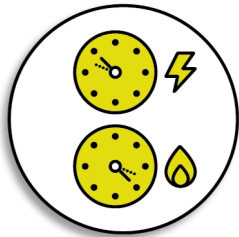
# Opportunities



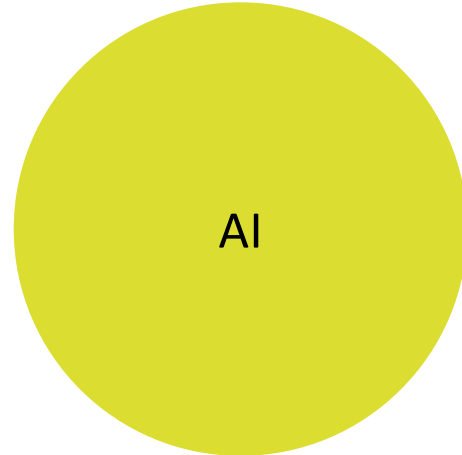
Marketplace  
optimisation  
e.g. Peer-to-peer  
trading.



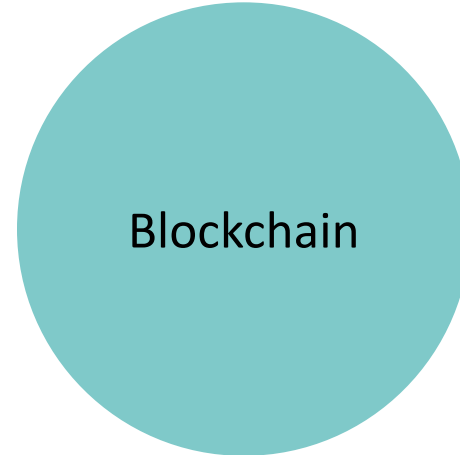
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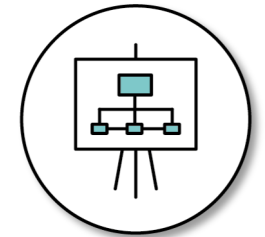


AI

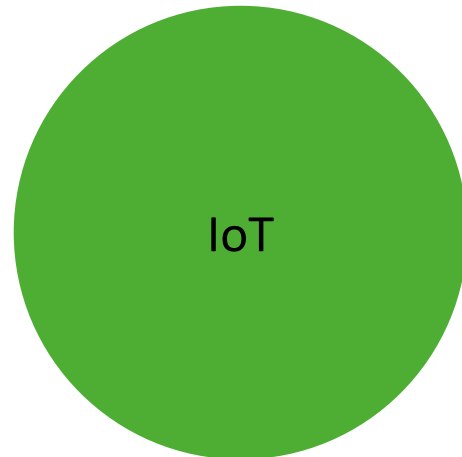


Blockchain

Marketplace  
optimisation  
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Efficient  
Consumption  
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IoT

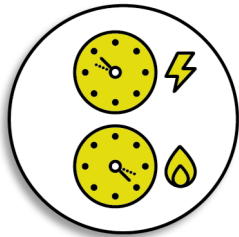


Big Data

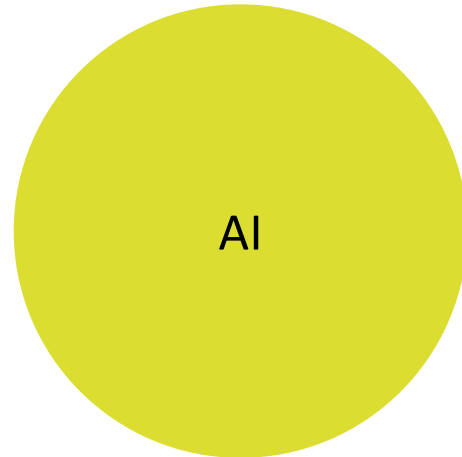
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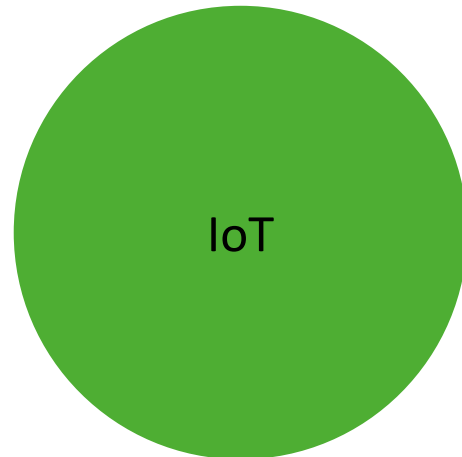
# Opportunities



Automated  
analysis



Smart  
street lighting



# Being prepared

# Our capabilities and assets



## Modelling

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Modelling (ESME)

Local Energy System Modelling

Building Energy System  
Modelling

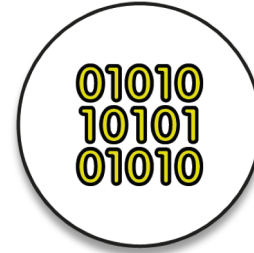


## Consumer Insight

Research

Design

Trials



## Digital

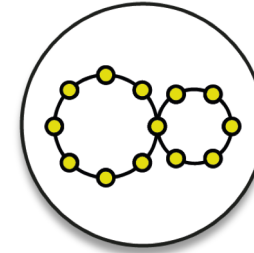
Home Energy  
Services Gateway

Living Lab

Data Science

Data Systems

Energy Knowledge  
eXchange™



## Systems Integration

Systems Engineering and  
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Business Model Innovation

Dynamic Energy System  
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Networks and  
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Nuclear

Renewables

Transport

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**Mission:** Unleash innovation and open new markets to capture the clean growth opportunity

170

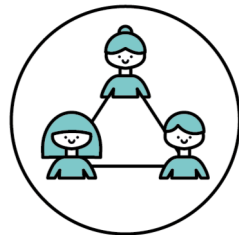
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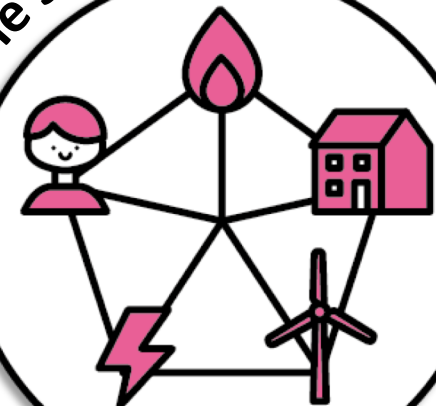


Digital



Modelling and simulation

We take a whole systems view



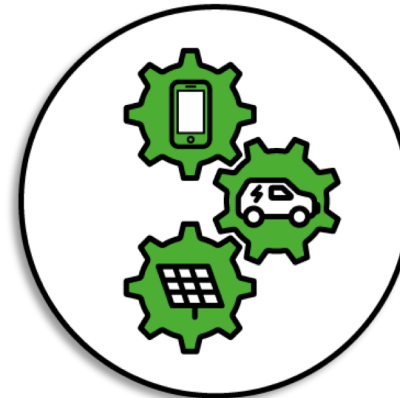
# Being prepared



**Data**



**Whole energy  
systems**



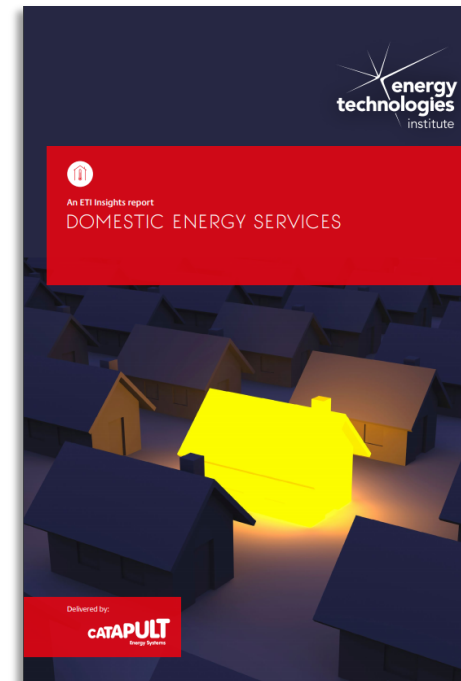
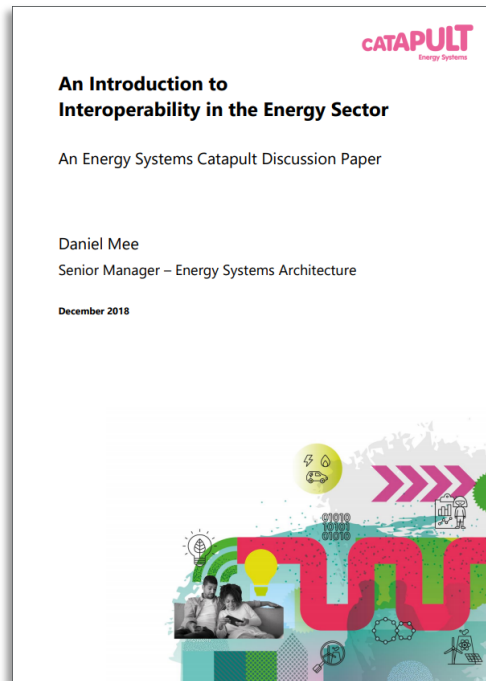
**Interoperability**



**Living  
Lab**



# Current reports



Reports available at [es.catapult.org.uk](https://es.catapult.org.uk)

**Thank you**

**CATAPULT**  
**Energy Systems**

[communications@es.catapult.org.uk](mailto:communications@es.catapult.org.uk)