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BISEPS |

Business clusters **I**ntegrated **S**ustainable **E**nergy **P**ackage**S**

Re-energise Manor Royal

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1. UK context & Project Introduction

UK policy and legislation

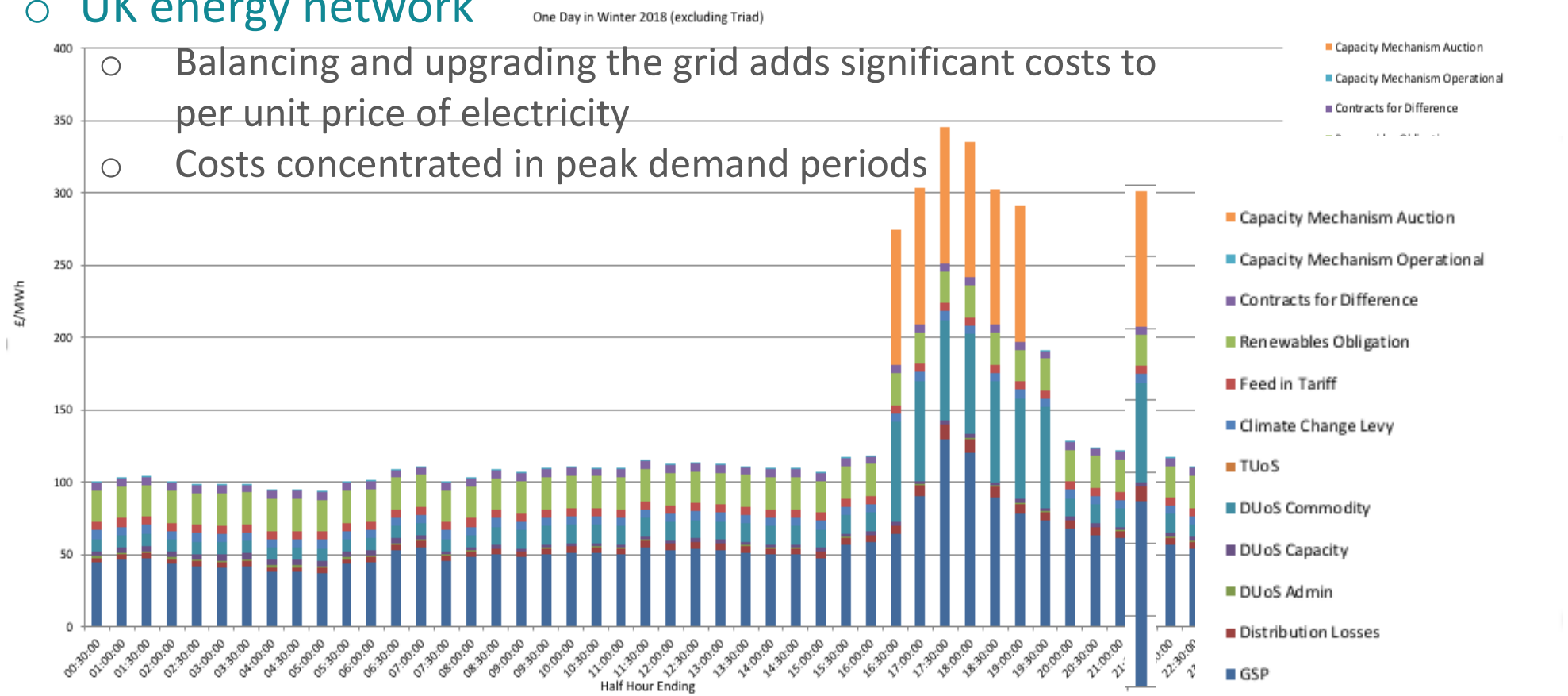
- Climate Change Act (2008)
  - 50% reduction by 2027
  - 80% reduction by 2050
- Climate Change Levy
  - 1st April 2019 (£/ KWh)
    - Electricity 68% increase
    - Gas 59% increase
- Feed in Tariff
  - Stops April 2019
- Minimum Energy Efficiency Standards
  - Penalties for commercial landlords if EPC <E

1. UK context & Project introduction

- UK policy and legislation
  - Energy Saving Opportuntiy Scheme
    - Large firms >250 employees
    - Mandatory reporting on energy use and CO_2 emissions
    - Produce roadmap of how energy savings could be made
- Future Developments?
  - Multiple policies set to expire
    - Stronger compliance and incentives possible
    - Theresa May pledges to reduce energy use in newbuilds by 50% before 2030

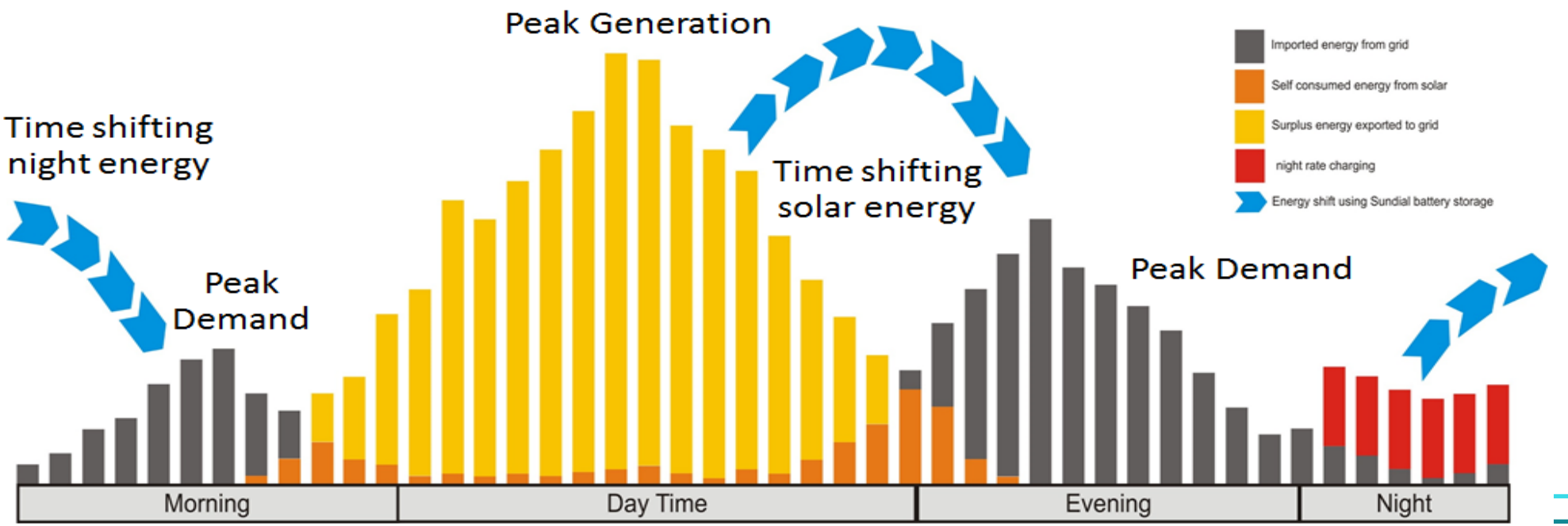
1. UK context & Project introduction

- UK energy network
  - Balancing and upgrading the grid adds significant costs to per unit price of electricity
  - Costs concentrated in peak demand periods



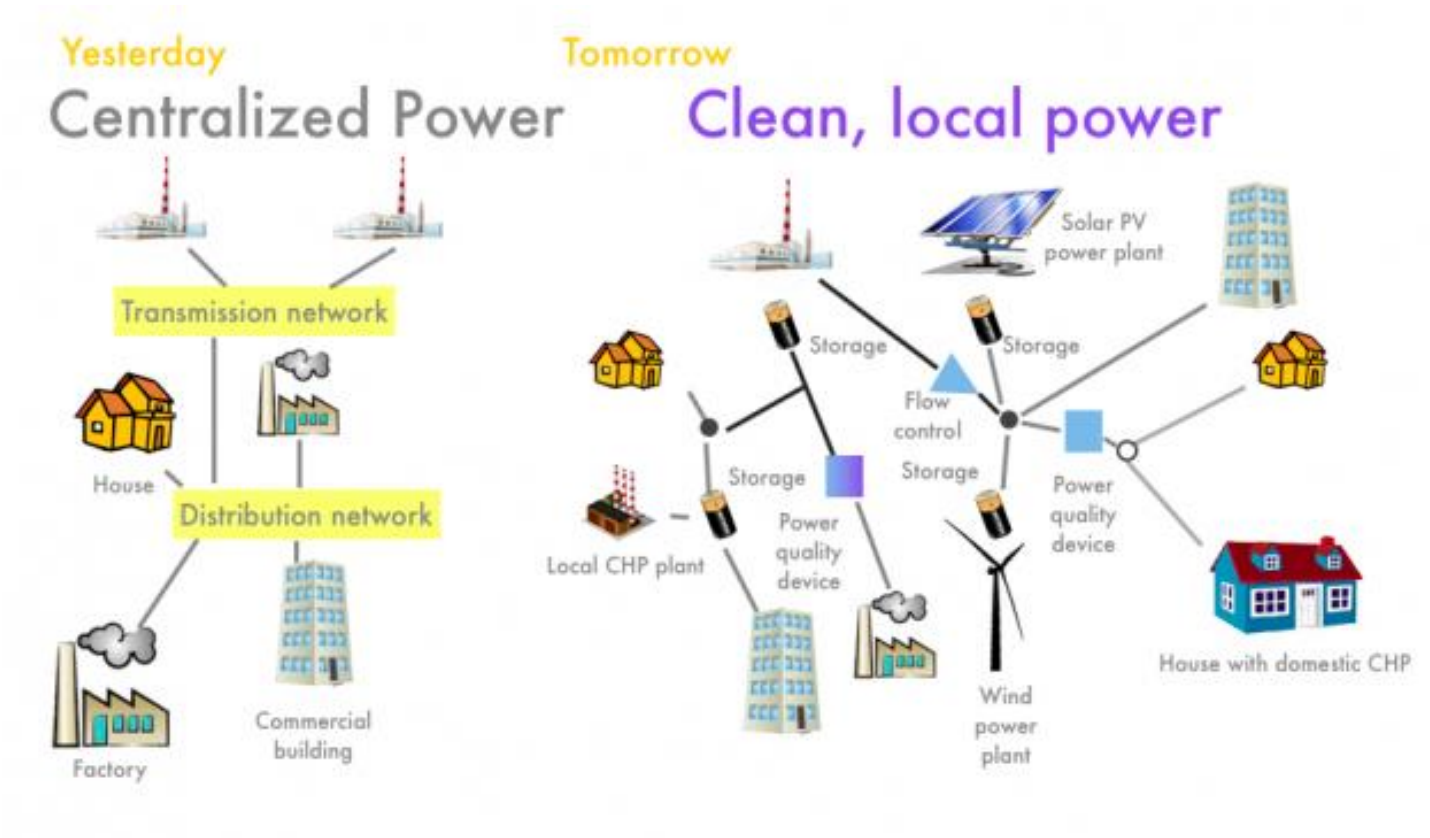
1. UK context & Project introduction

- UK energy network
  - Utilisation of RE technologies can
    - Reduce climate compliance risks
    - Insulate from energy price shocks



1. UK context & Project introduction

- BISEPS Project



1. UK context & Project introduction

- BISEPS Project
  - Aims and Outputs
    - Develop a tool for high level assessment of projects for sustainable energy in business clusters
    - Aims to increase the use of sustainable energy within businesses clusters
  - Location
    - Is being implemented in four EU countries
    - Manor Royal identied as perfect living lab

2. Strategic Opportunities Study Manor Royal

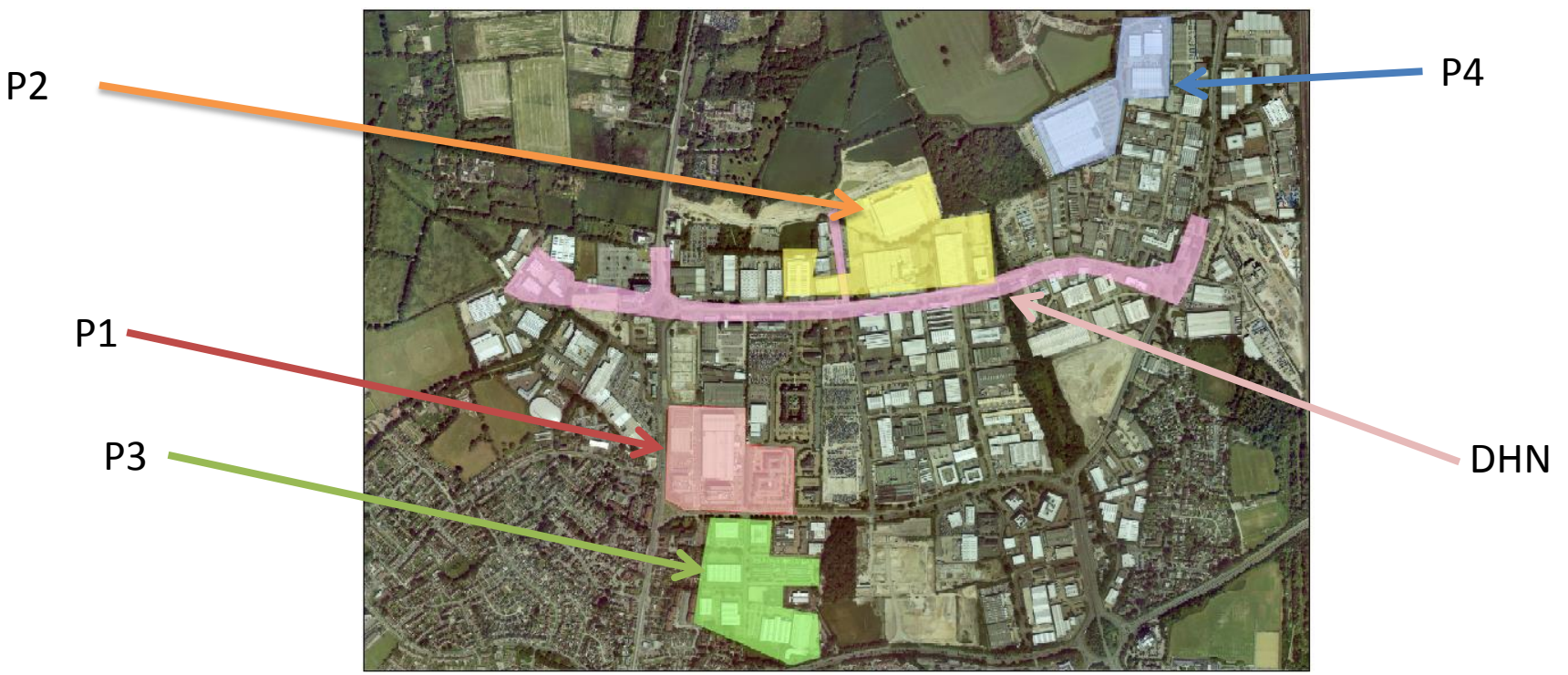
Report outline

- Main aims of the strategic opportunities study
  - Investigate synergies between business clusters
  - Identify a small number of opportunities for further investigation
    - Determine which technologies can be taken forward
    - Practical
    - Commercially viable
  - Focus on low carbon electricity generation in conjunction with the parallel study of district heat network
  - Stimulate Manor Royal's transition to a low carbon energy infrastructure and economy
  - Provide a baseline for the BISEPS model to be refined

2. Strategic Opportunities Study

Outputs

- Business clusters identified for further investigation



2. Strategic Opportunities Study

Outputs

- Four technologies identified
  - Solar PV
  - CHP
  - Solar Car Ports
  - Solar PV plus Battery Storage

2. Strategic Opportunities Study

Outputs

- With real data from businesses we can improve the validity of outputs for power clusters and district heat network study

Opportunity Cluster	Technology Configuration	IRR (%)	NPV @ 3.5% (£)	Simple Payback (yrs)
Power 1	Solar PV	14.1%	£675,898	7
	CHP	25.3%	£1,871,770	5
	Solar Car Ports	4.3%	£74,096	15
	Solar PV + Battery	5.6%	£212,332	13

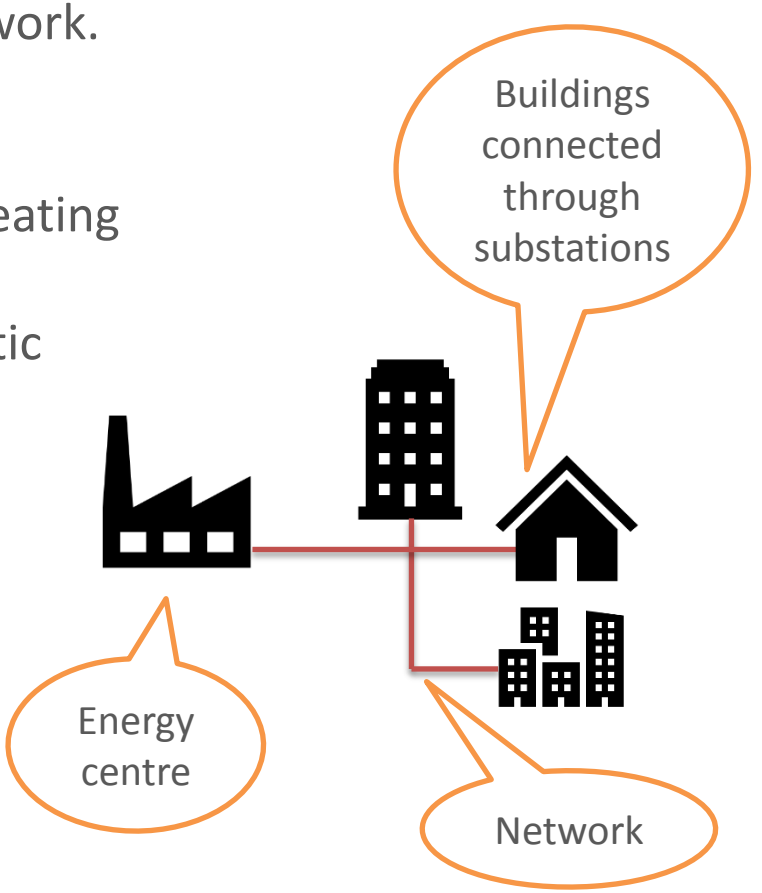
2. District Heating network principle

CBC commissioned an Energy Mapping and Masterplanning study to develop district heating network.
Distribution system of:

- **Network**, insulated pipes that takes heat from
- An **Energy Centre**, a central source that delivers heating and/or hot water to
- **Substations**, a number of domestic or non-domestic buildings.

Central source: low carbon technology

- ✓ combined heat and power plant (CHP);
- ✓ heat recovered from industry,
- ✓ canals or rivers water source heat pump,
- ✓ energy from waste plants,
- ✓ biomass,
- ✓ fuel cell...



2. Heat network masterplanning

Key benefits:

- Innovative infrastructure ➔ attracting new businesses and investment
- Purchase of low-carbon, low-cost energy ➔ businesses more sustainable
- Carbon reduction and air quality improvement
- Delivery of energy security through increased resilience to price rises

2. Heat network masterplanning study

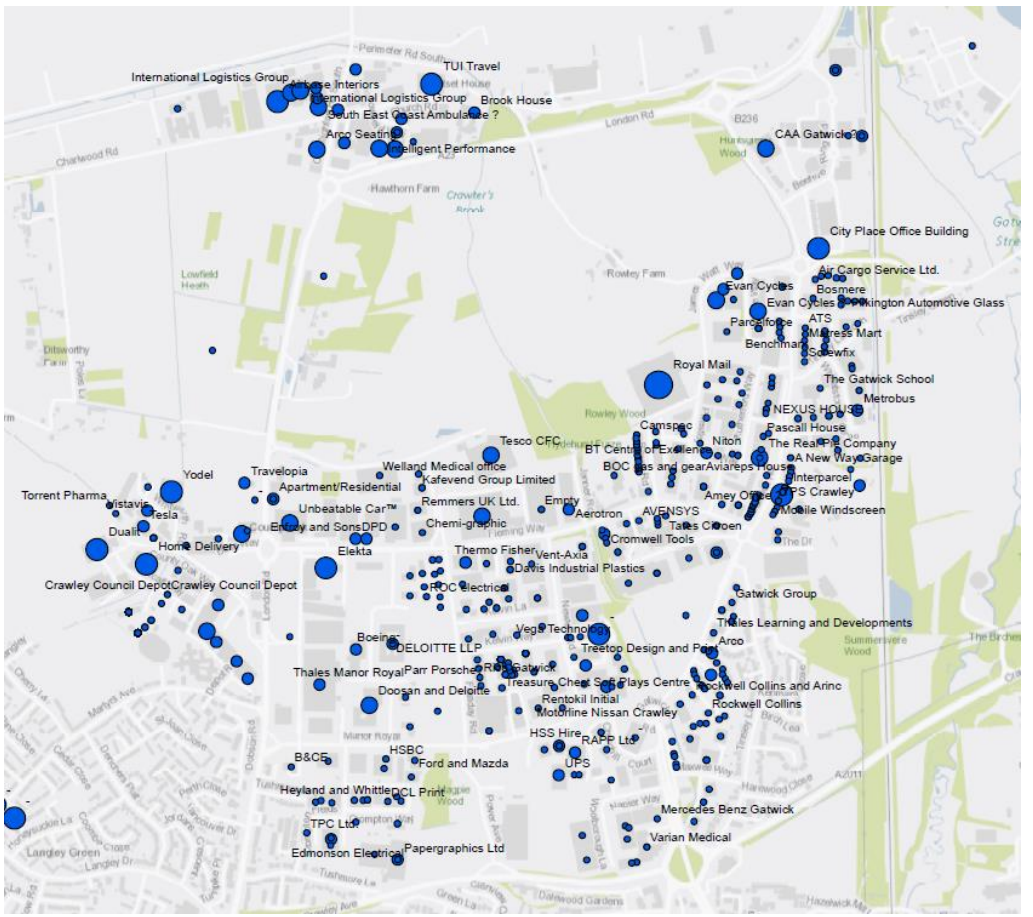
- Two stages study

Heat Mapping:

- Identify the main heating loads
- Select areas for potential heat network system
- Identify supply options

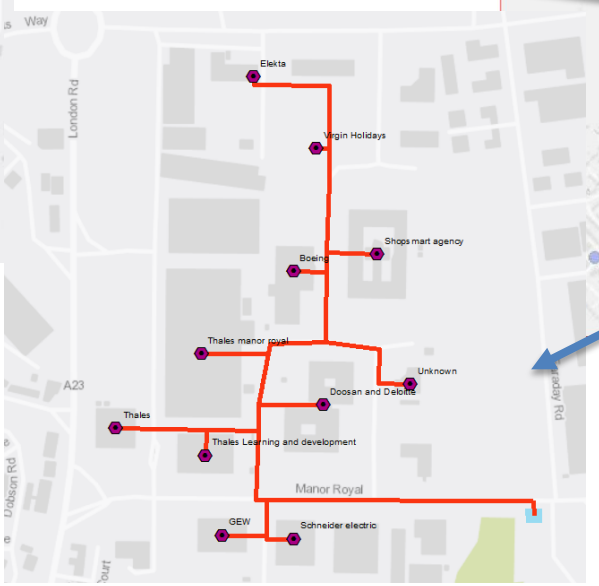
Masterplanning:

- Technical and economic study of the preferred clusters



2. Heat network masterplanning study

Heat Mapping conclusion: Two clusters selected A & B



2. Heat network masterplanning

Key Risks and challenges

Technical	Risks	Actions/mitigation
Estimated data for energy demand assessment (inaccurate)		Businesses to provide energy data
Insufficient space to locate the energy centre		Discussions with Partners & Businesses
Building systems incompatibility with District Heating network		Discussion with Businesses Site visits to organise in plant room
Planned route cannot be achieved		Council to provide utilities maps Engagement with partners
Financial & Commercial	**Risks**	**Actions/mitigation**
Weak Business delivery model		Relationship with stakeholders Identify viable commercial delivery structures
Assumptions (heat prices, investments, energy costs etc.) incorrect		Existing energy prices to be provided by businesses when possible Ramboll past projects experiences
Weak Engagement & customers not connecting/disconnect later		Engagement with businesses early in the project

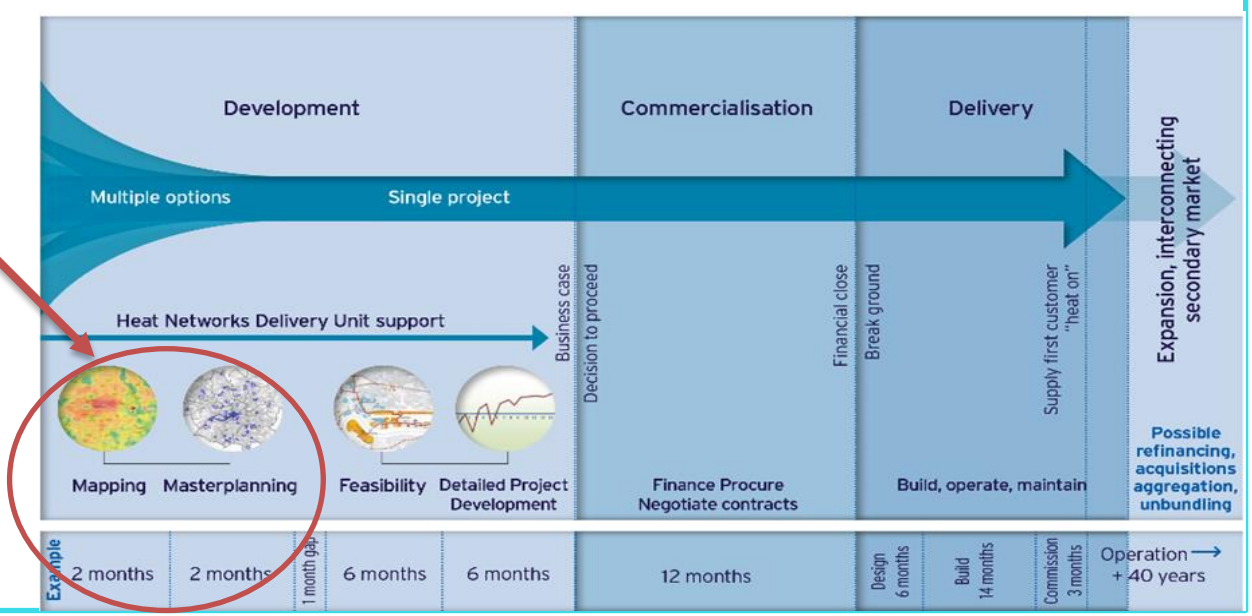
2. Heat network masterplanning

Next Steps of the heat mapping and masterplanning:

- Review the energy demand of the businesses selected in Clusters A and B,
- Technical study to confirm the connections and supply option (technology, size, location)
- Economic study to calculate key financial results

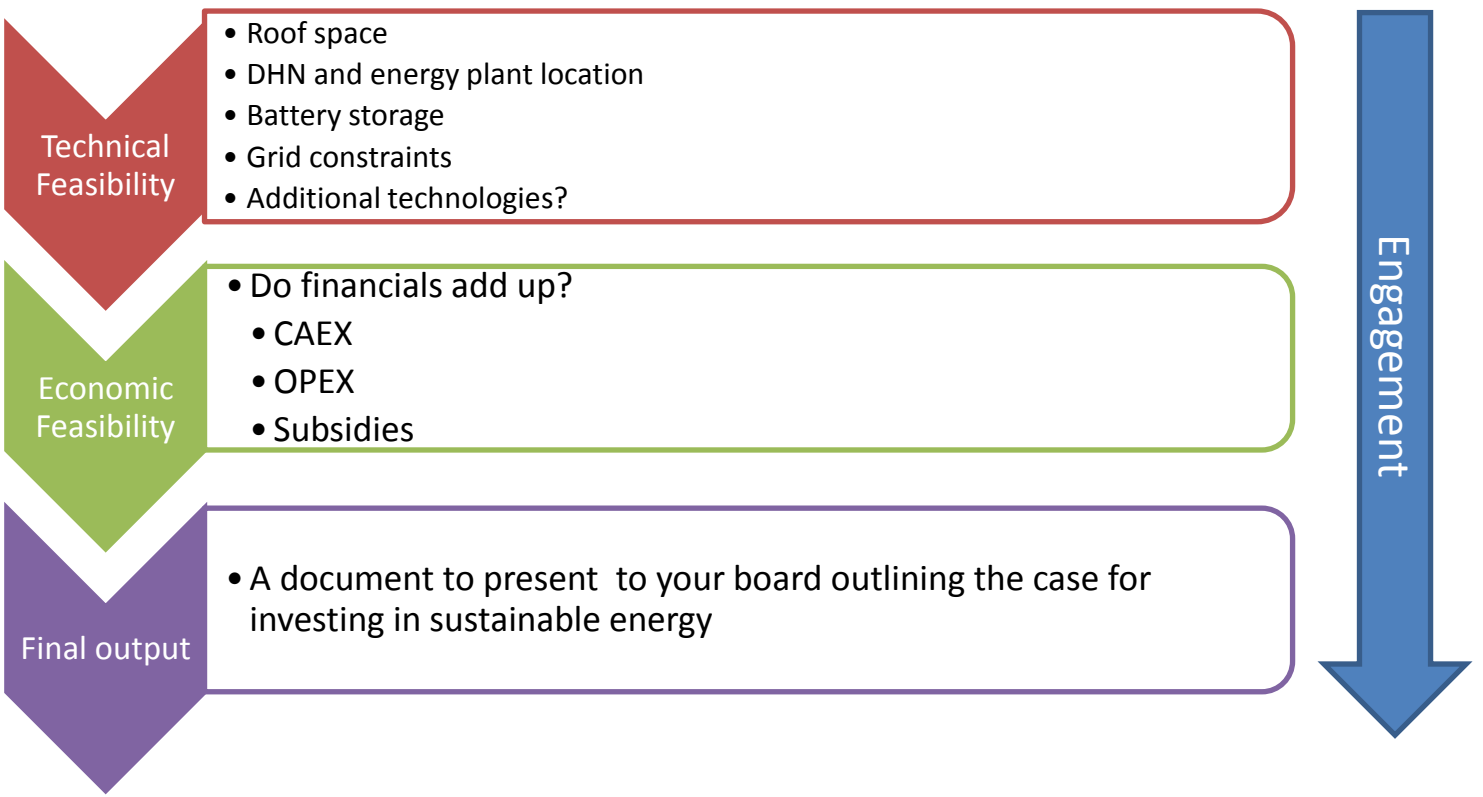
What could happen after the study?

✓ Feasibility study
✓ Detailed design
✓ Commercialisation & Delivery



3. Feasibility Study & development of outline business case

Report outline



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4. New Models

- Energy Co-operative

  has the potential to draw people in, not just as consumers but as active partners, in a process of change.

  Partners because businesses share in the benefits, have some say in how things happen, are actively involved and feel a connection with the outcomes.

4. New Models

- Energy Co-operative
  - WSCC is investigating the different financial and governance models for co-operative energy that is business focussed
  - Analysis of which governance models work well with each finance model

4. New Models

- Peer to Peer Energy Trading
  - Banister House - Hackney, London
    - Solar, Battery Storage and Blockchain enabled Smart meters
    - Allows energy to be traded between residents
    - Greater utilisation of local energy & lower prices

4. New Models

- Adapting Technologies to local needs
  - Pembrokshire, South Wales
    - Innovative business case for 700 kW wind turbine
    - Private wire + Electrolyser produces hydrogen for local haulage company
      - Ensures viable business case without FIT

4. New Models

- Creating a smart grid
  - Greater Manchester
    - Smart meters, AI & batteries
    - Identify users energy use patterns & predict times of stress for the grid
    - Can automatically provide:
      - Flexibility services
      - Price arbitrage

4. New Models

Project example

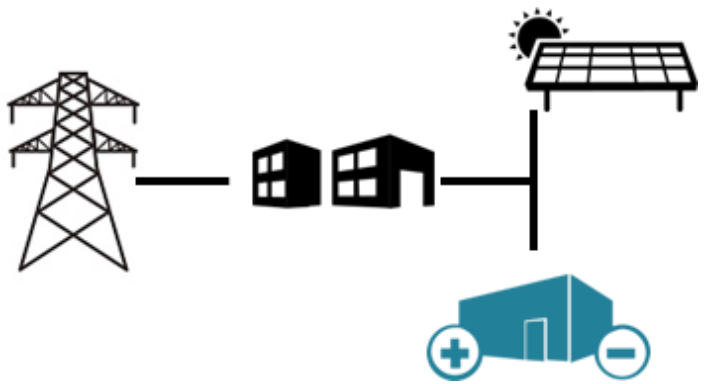
- Solar CarPark
  - Energy self production
  - Energy & cost savings
  - Better CO_2 footprint
  - CSR Measure

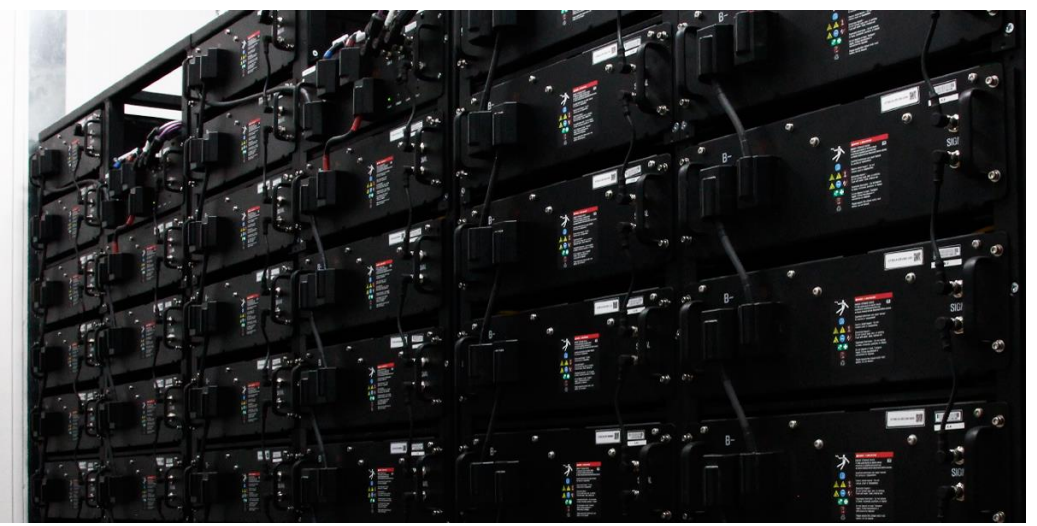
Amazon, logistic business
570kWp, 2-axis tracker
Hersfeld, Germany

4. New Models

Project example

- Solar PV Battery System
  - Energy self production
  - Energy & cost savings
  - Peak shaving
  - Backup & resilience
  - Better CO_2 footprint
  - CSR Measure



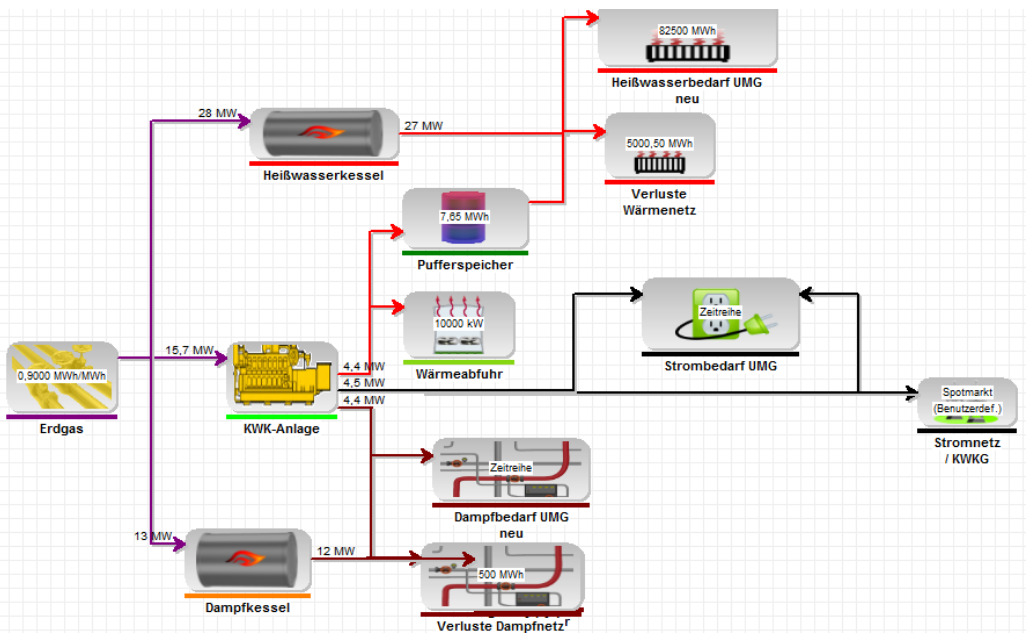


Manufacturer automotive
>300kWp with >800kWh
Confidential, Germany

4. New Models

Project example

- CHP for electricity, heating & cooling
  - Energy self production
  - Energy efficiency
  - Cost savings
  - Better CO_2 footprint
  - Sustainable system with storage solutions



University Medical Center
CHP with steam & storage
Goettingen, Germany

5. Challenges and questions

- Community energy
  - How do we adapt the domestic examples for a business park?
  - What are the gains for businesses to work co-operatively?

5. Challenges and questions

- Peer-to-peer energy trading
  - Can we do this?
  - Do we want to do this?
- Creating a smart grid
  - How do we put the domestic examples into a business context?

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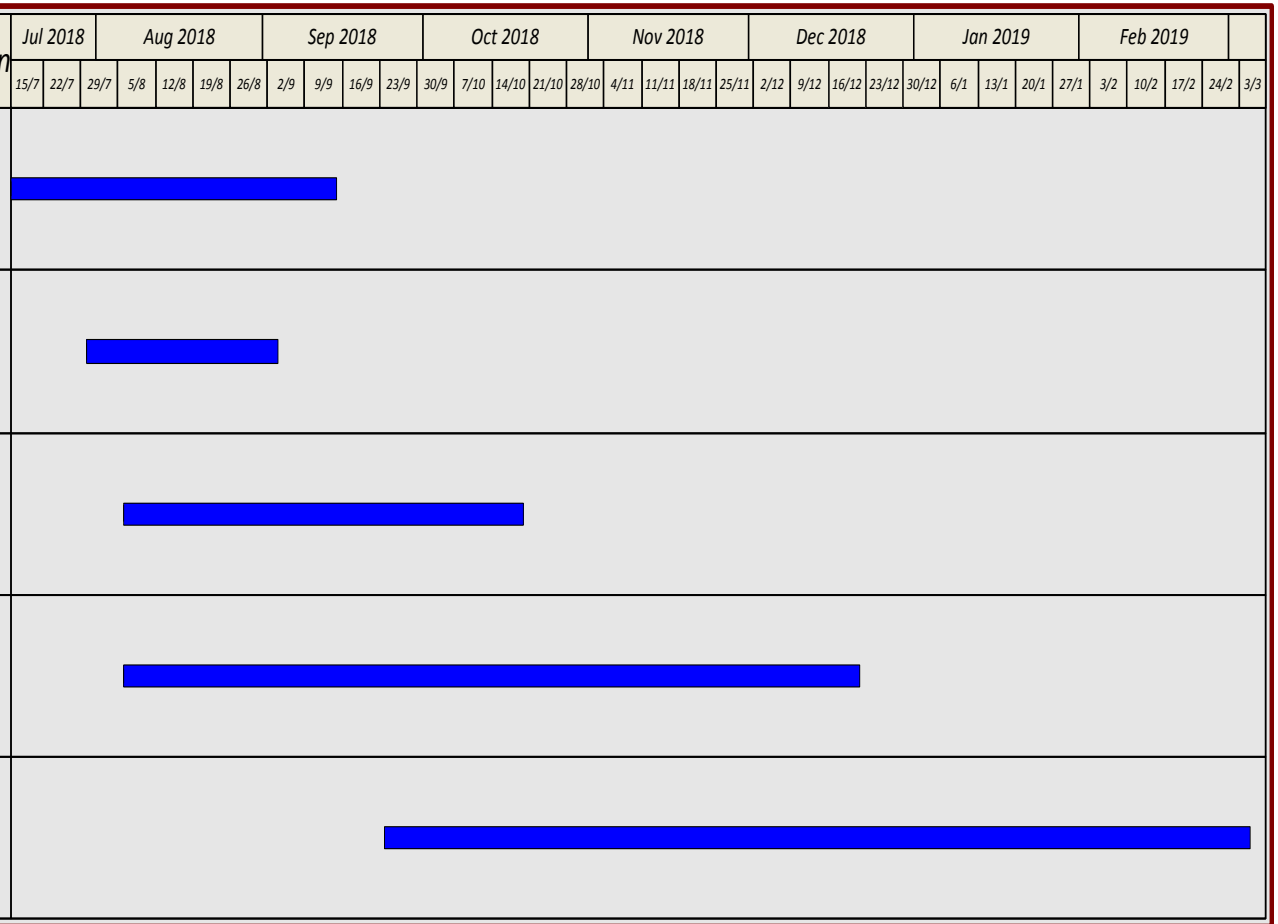
6. Project Timeline

ID	Task Name	Start	Finish	Duration
1	Stakeholder engagement & data collection	16/07/2018	14/09/2018	45d
2	Feasibility study completion	30/07/2018	03/09/2018	26d
3	Outline business case development	06/08/2018	19/10/2018	55d
4	Finance option development	06/08/2018	21/12/2018	100d
5	Full business case development	24/09/2018	04/03/2019	116d



6. Project Timeline

- Next steps
  - Return the data request by COP Monday 23 July
  - Organise meetings with each cluster (or business) within two weeks
  - Next meeting of Re-Energise Manor Royal Steering Group w/c 8 October
  - We need champions!!

7. Any Other Business

- AOB