

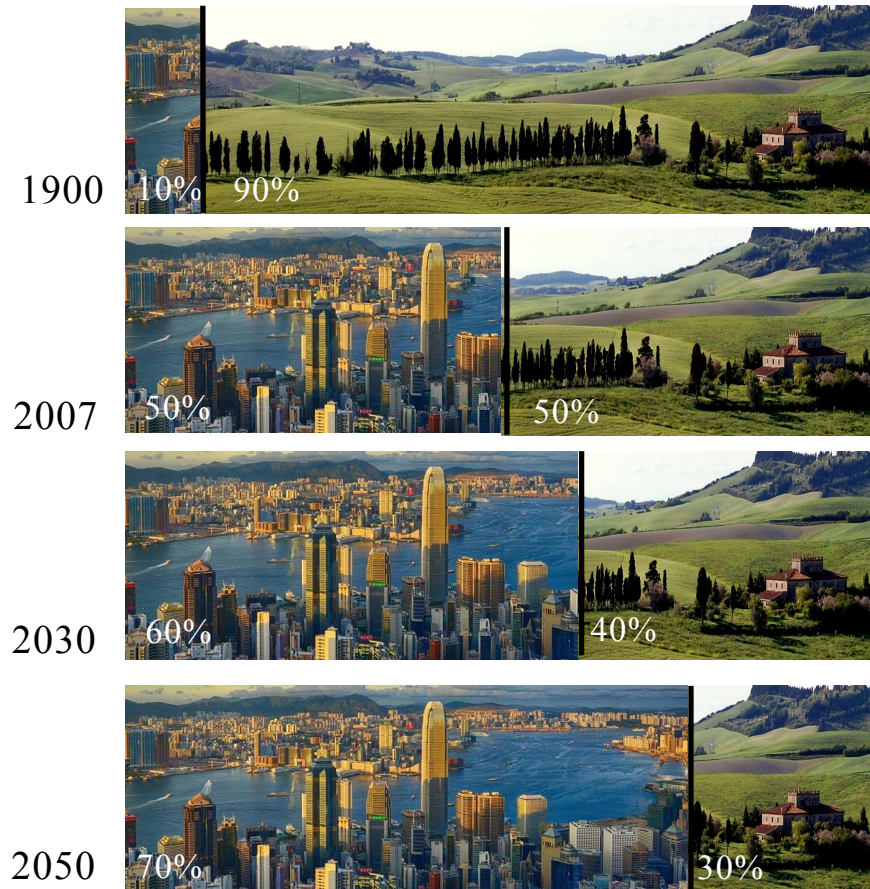
# Innovative energy solutions for smart cities

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Want global examples:  
GEON  
Transport, energy  
Low temperature heat networks  
Thermal storage  
Peaks

# Context

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1.4 million new people are moving into cities every week.

People are drawn to cities as centres of economic activity, social connection, opportunity, and innovation.

## Images from the smogs



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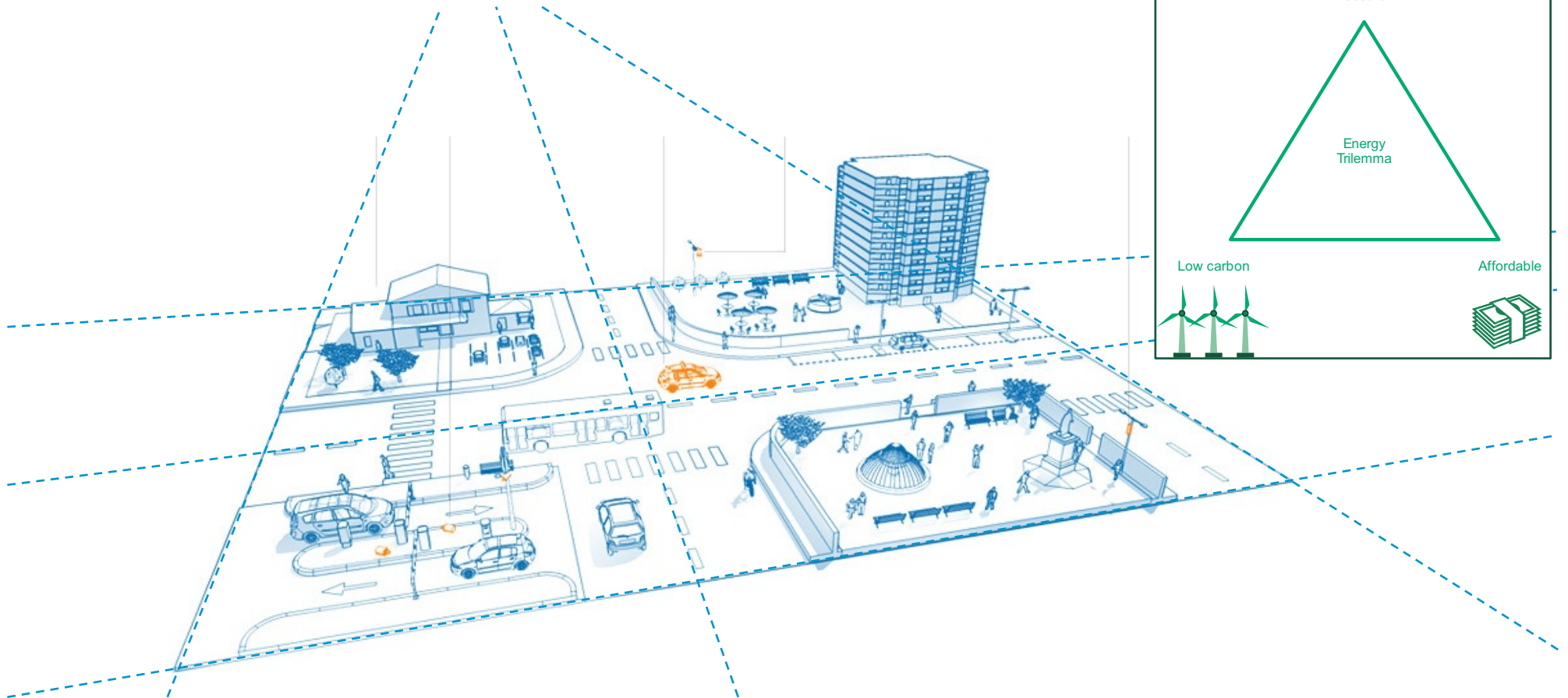


## Images from the smogs

Brobekk Incineration Plant, Oslo , December 2007



# Energy Challenges in Cities



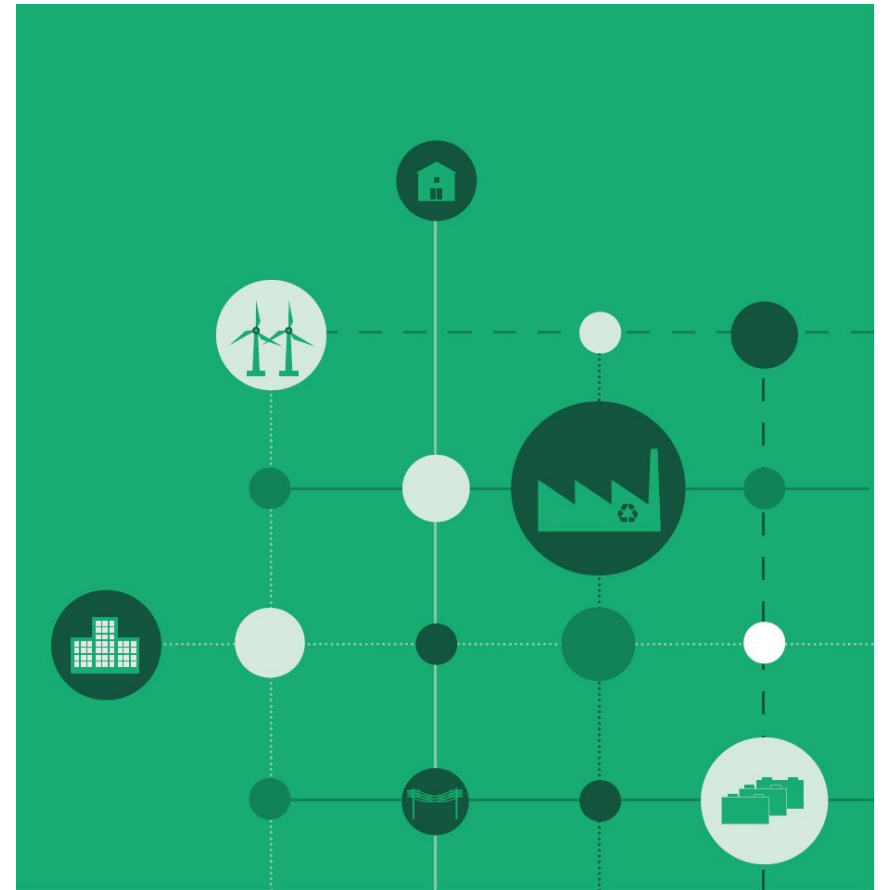
# Does energy generation in Cities make sense?

- A new imperative of climate change is pushing energy generation back into cities, because:
  - a) Development capital can be used
  - b) Available renewable resource would be locked out if not



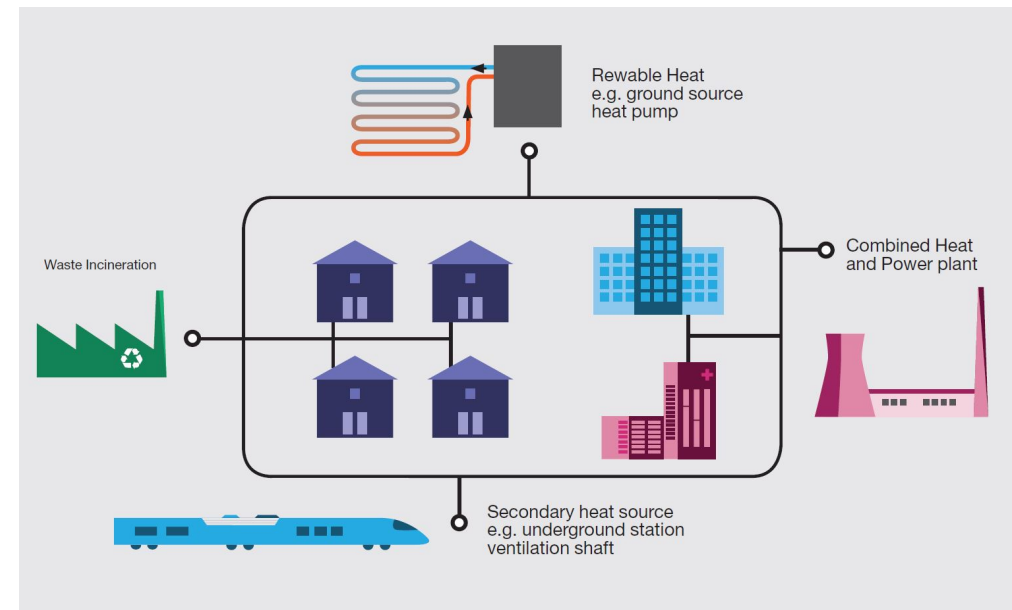
# How far can we push onsite energy generation, what are the alternatives

- Connectivity of buildings is key, but not in the traditional sense
- Mix of incentives and regulatory requirements:
  - Feed in Tariff
  - Time of day electricity pricing
  - Renewable Heat Incentive (RHI)



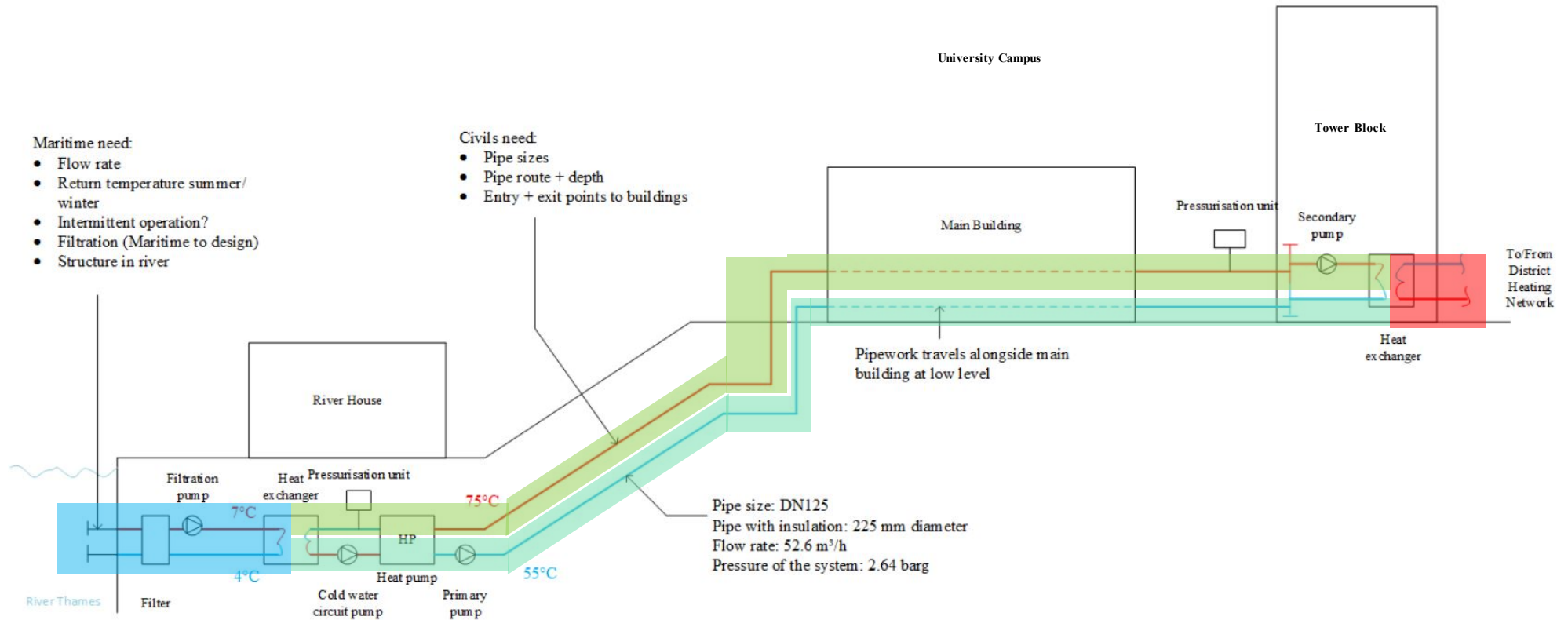
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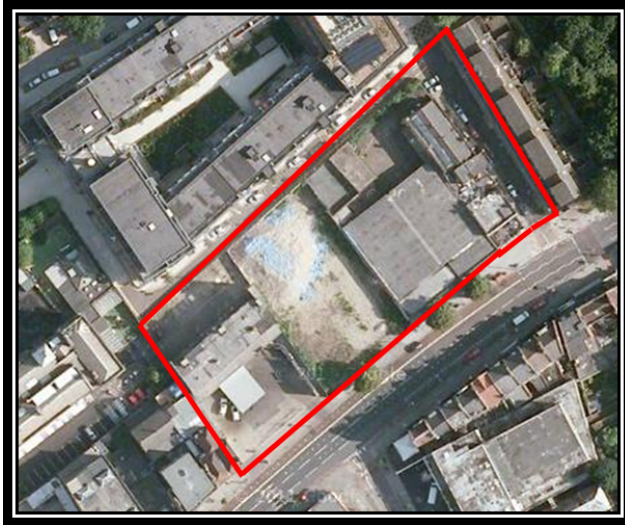


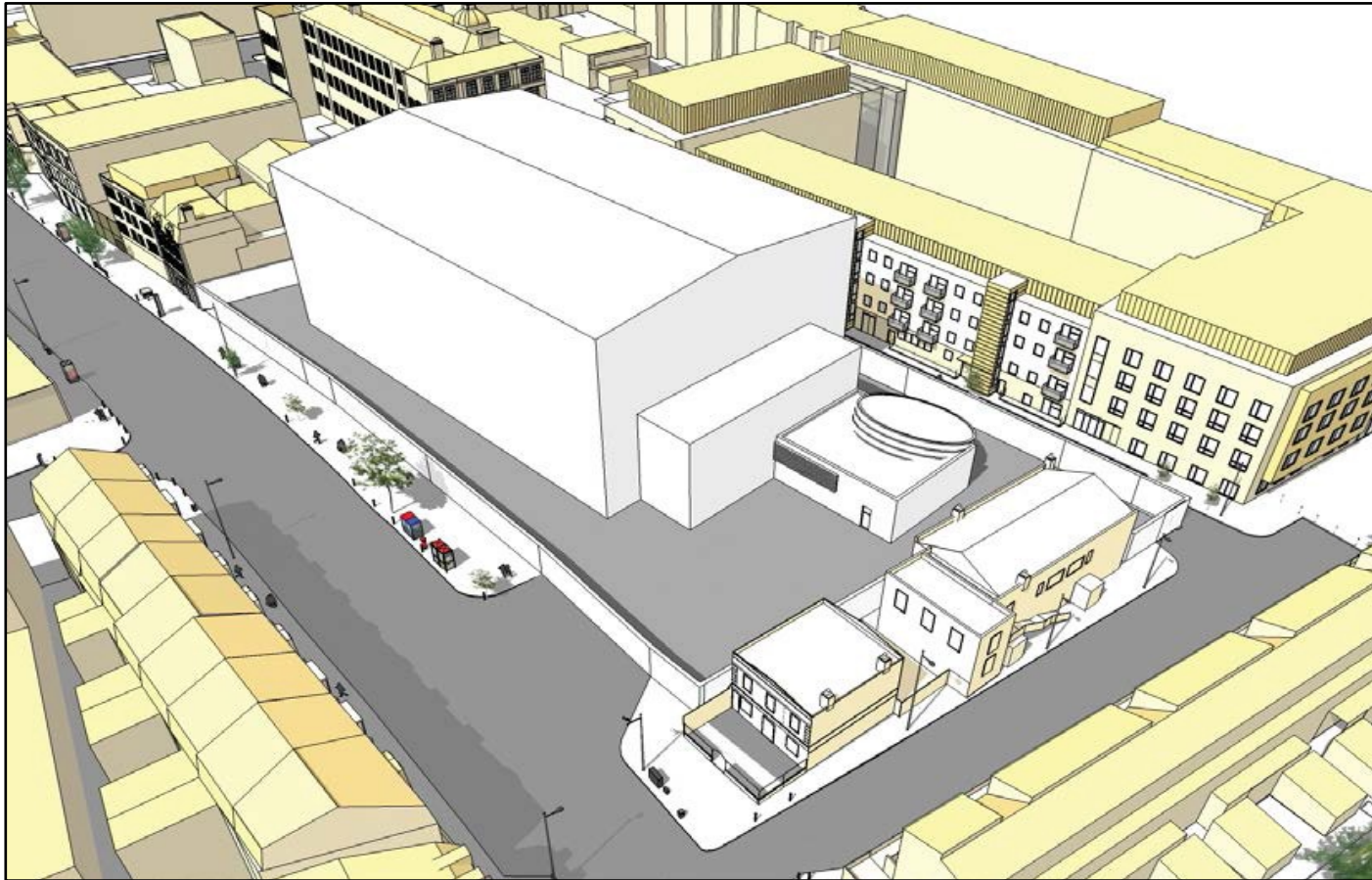


# Case study: Kingston



## Case study: National Grid Sub-station

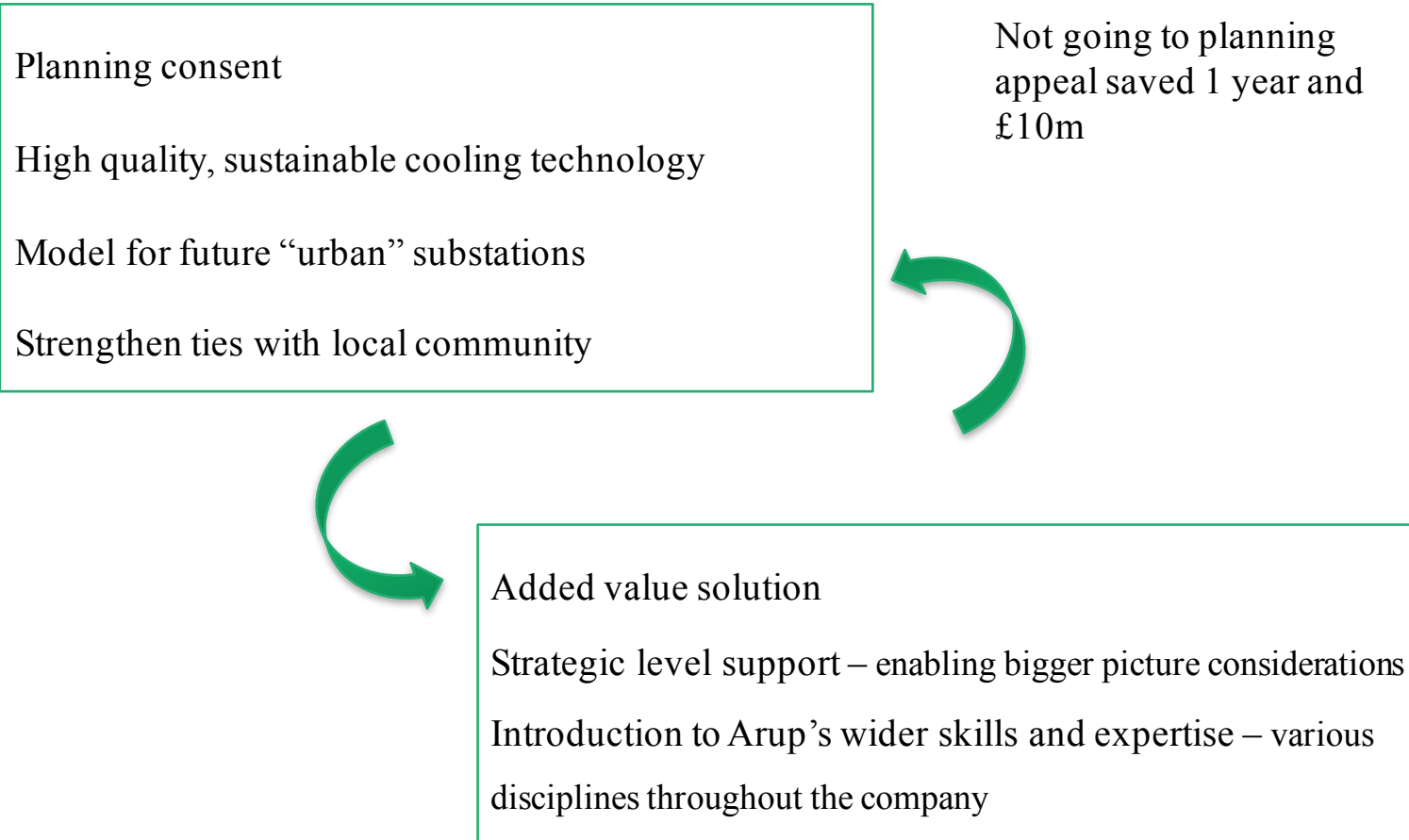








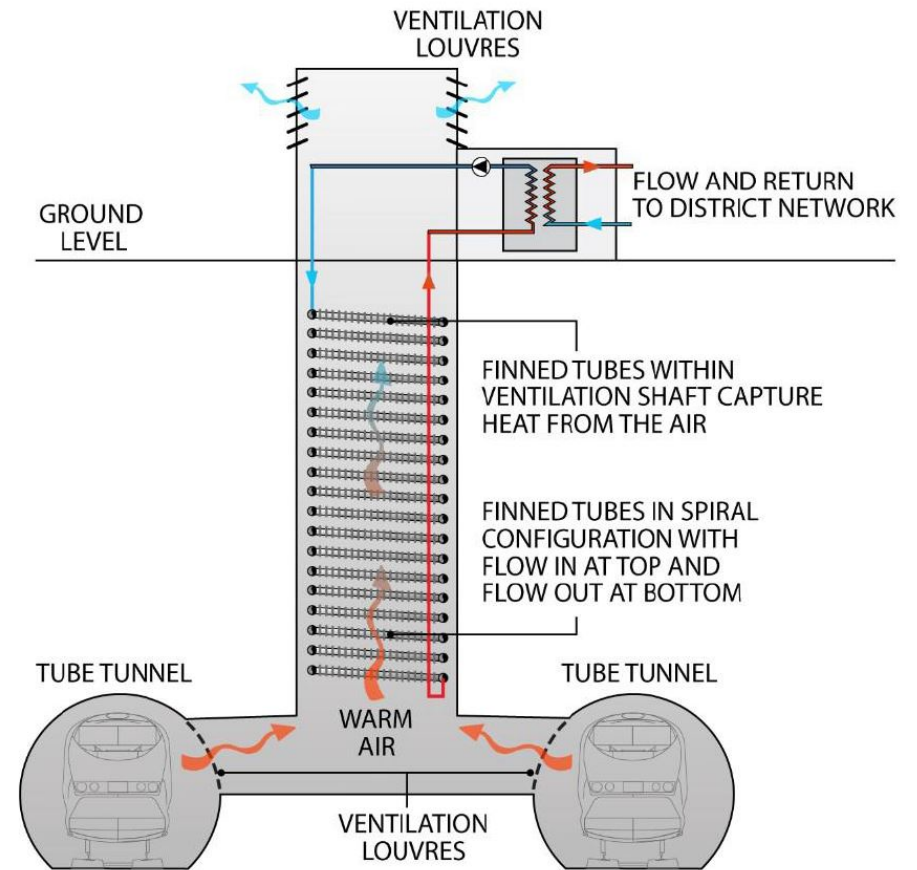
## Highbury Substation – A successful story of mutual benefit





## Case study: Bunhuill

- Waste heat source
- Clever electricity pricing

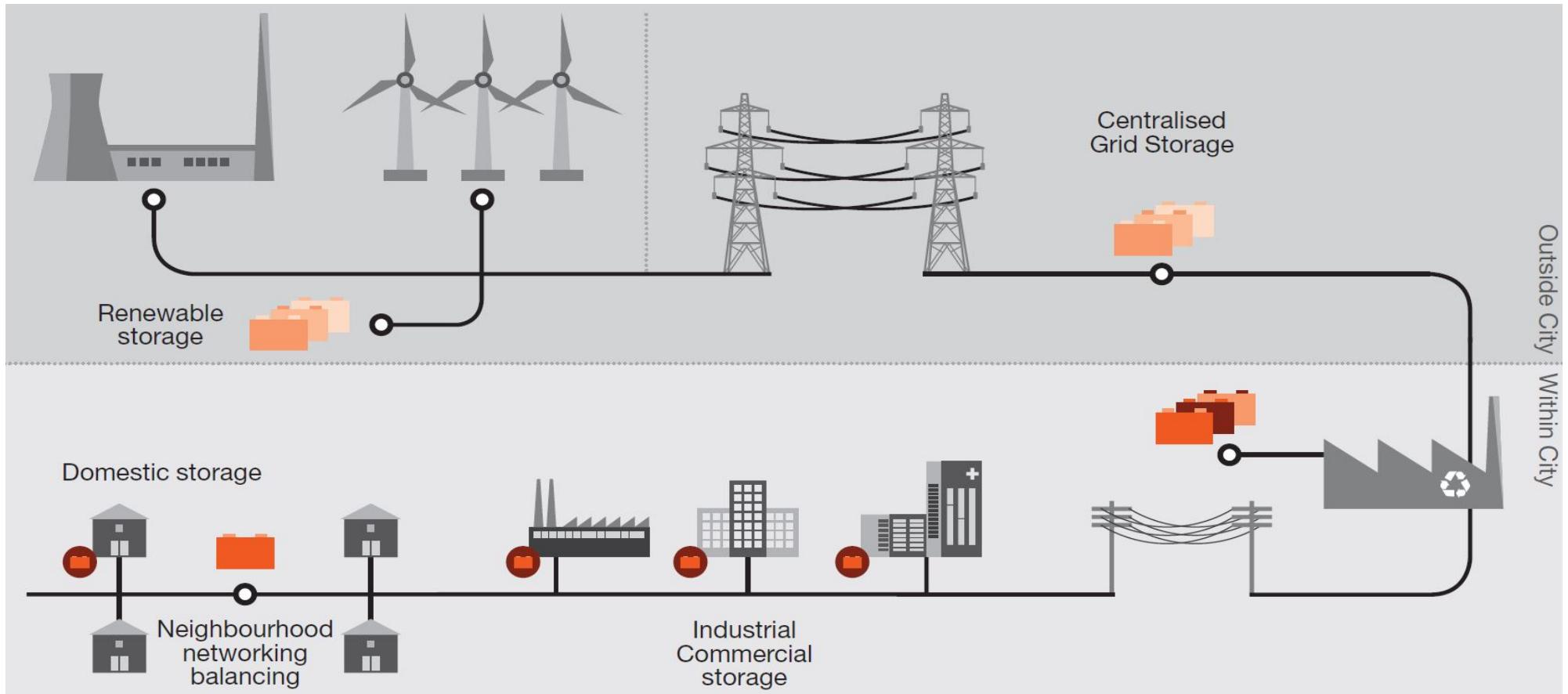


## Case study: Solar

- How to make money out of solar
  - Feed in Tariff



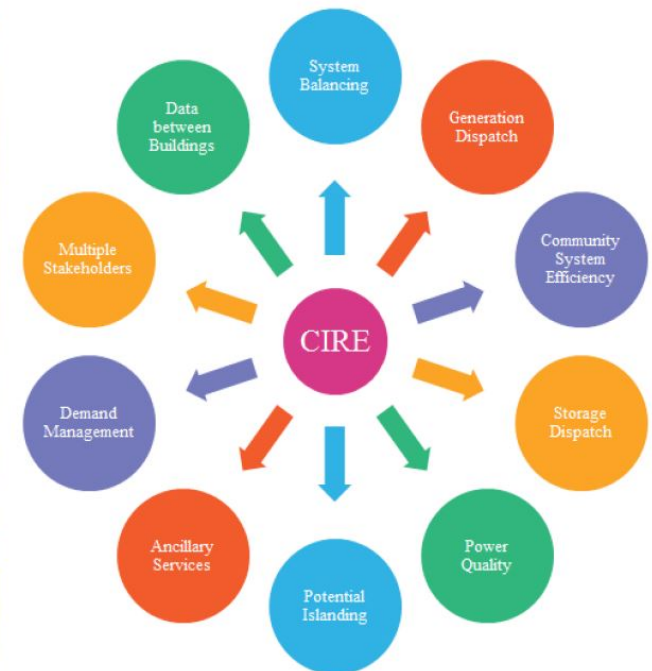
## Case study: Battery storage



# Case study: mini-micro grid in buildings

Arup has been tasked to:

- Determine regulatory barriers and cost of enabling CIRE Projects
- Identify areas where innovative electrical distribution networks
- Model areas of the community
- Explore additional thermal energy opportunities in the District





## Case study: energy efficiency

- Energy efficiency is difficult:
  - High transaction costs
  - Low returns
- Smart energy solutions can use large data sets to quickly analyse a solution.



INSURANCE

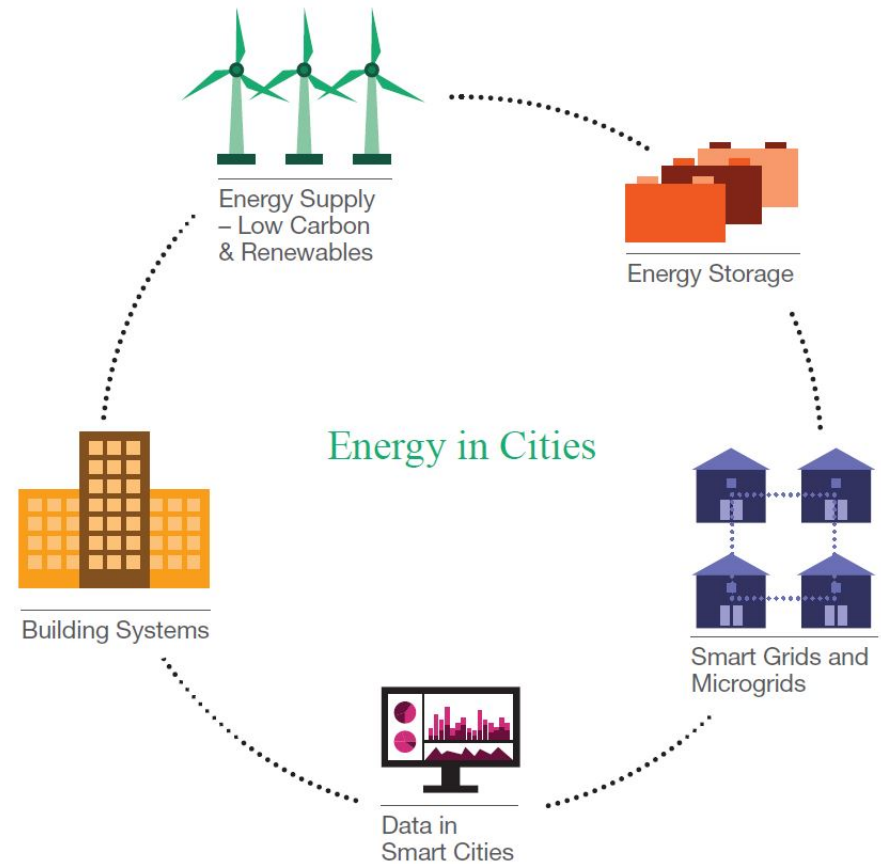
#### 4 Reference & Bespoke Apps for Devices





# Conclusion

1. Share data openly
1. Use development capital to unlock renewable resource
2. Adjust energy service delivery
3. Adjusting regulatory conditions and governance
4. Adjust markets and fiscal incentives for smart energy provision
5. Energy modelling and scenario planning



# Thank you

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