

LTDH system in Nottingham (REMOURBAN project)

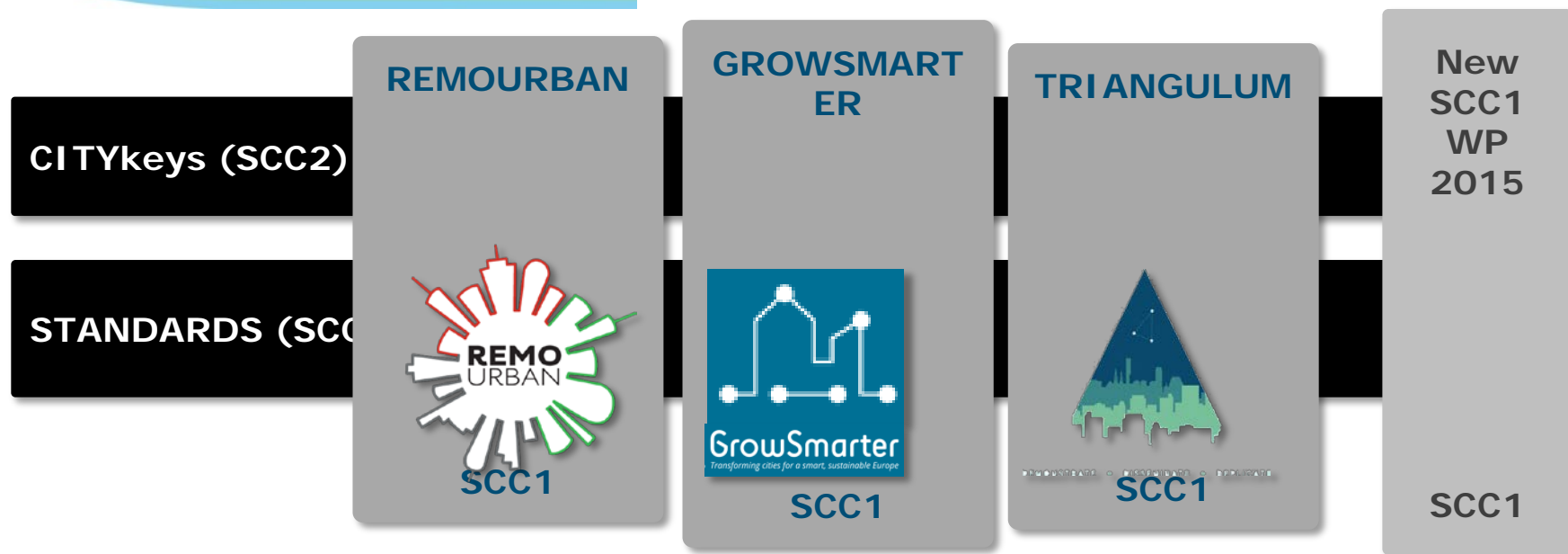
Nottingham Trent University

Dr Anton Ianakiev

LTDH system in Nottingham (REMOURBAN project)



EUROPEAN INNOVATION PARTNERSHIP ON SMART CITIES AND COMMUNITIES



LTDH system in Nottingham (REMOURBAN project)

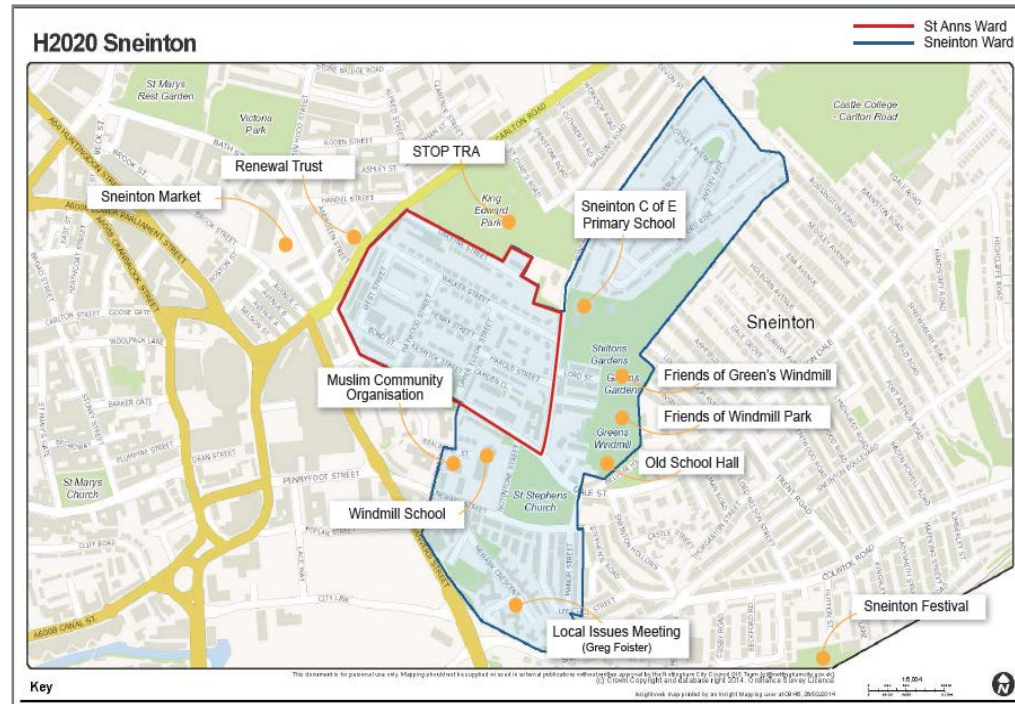


- Integration of:
 - Energy
 - Transport
 - ICT
- Three EU cities:
 - Valladolid (Spain)
 - Nottingham (UK)
 - Eskisehir (Turkey)
- Two follower cities:
 - Seraing (Belgium)
 - Miskolc (Hungary)
- 6M Eu for Nottingham over 5 years



LTDH system in Nottingham (REMOURBAN project)

REMOURBAN Project area



- The area around Sneinton Road, Sneinton, Nottingham is considered as the most appropriate for the development of the REMOURBAN (DEMO site).
- The site is very close to the existing district heating. The pipe line is reaching the Bio City which is very close to Sneinton Road (100 – 200m).
- A large number of the properties (65%) in the area are social housing, owned by Nottingham City Council (NCC) and managed on their behalf by Nottingham City Homes (NCH).



Retrofitting the district

Archetype A - Victorian Terraced Property



Archetype B - 1930s Inter War Solid Brick Property



Archetype C - William Moss Bungalow



Archetype D - Timber Frame Cross Wall Flats



The project will focus on 8 property typologies ranging from one bedroom flats to three bedroom terraced houses, and in age, from 1900 to the 70s.



Retrofitting the district

Archetype E – Wimpey No Fines Concrete
Low Rise Flats, built in 1960s



Archetype F - William Moss Cross Wall House



Archetype G - Low Rise Flats and Maisonettes



Archetype H - High Rise Flats, built in the 1960s



The project will focus on 8 property typologies ranging from one bedroom flats to three bedroom terraced houses, and in age, from 1900 to the 70s.

Nottingham District Heating network



Nottingham's existing extensive Energy-from-Waste (EfW) district heating network, currently supplying 4,900 homes close to the Demo site, means that there is an opportunity to supply the blocks with an efficient and low-carbon heating supply.

It is proposed that a branch emanating from the return pipe of the primary mains is created to use low temperature heating from the *return* the first time on this system and maybe in the UK.

Eastcroft incinerator



- The heat energy mainly comes from the annual incineration of around 170,000 tonnes of municipal waste at Eastcroft incinerator
- The Nottingham District Energy Network is comprised of approximately 68km of insulated pipework carrying pressurised hot water around Nottingham City Centre satisfy the heating and hot water requirements of circa 4,900 dwellings and over 100 commercial premises
- It is a Combined Heat and Power (CHP) Plant, the steam is also run through a generating turbine to produce 60,000MWh of electricity annually.

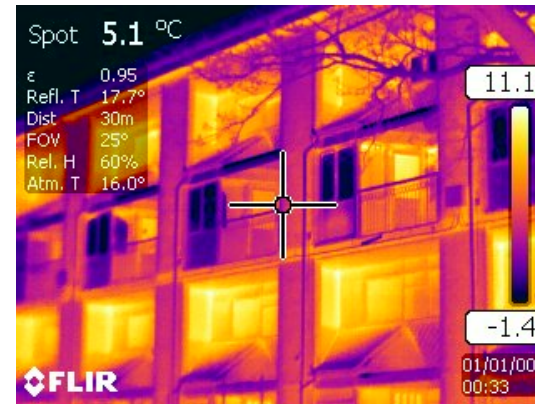
Low Temperature District Heating (LTDH)

The key environmental benefits are as follows:

- Energy-from-Waste (EfW) largely removes the requirement for Nottingham and surrounding Boroughs to landfill refuse;
- The Combined Heat and Power (CHP) plant integrates the production of both usable heat and power (electricity) into one single, highly efficient process.
- Enviroenergy participates in TRIAD avoidance, helping the National Grid meet periods of high demand;
- The District Energy Scheme offsets approximately 27,000 tonnes of CO₂ emissions annually that would otherwise be produced by alternative use of gas.



Low Temperature District Heating (LTDH)

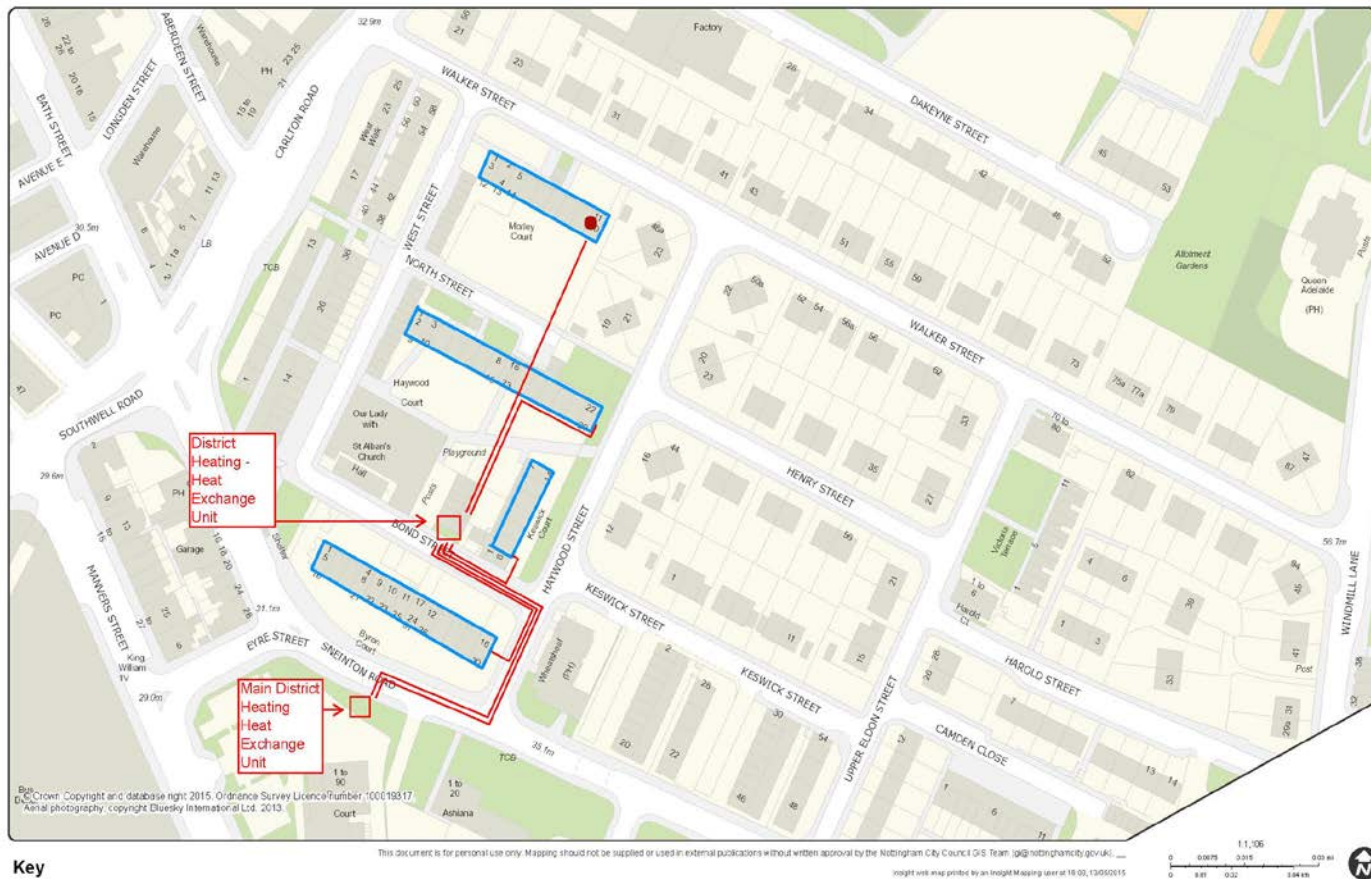


Advantages of Low Temperature District Heating

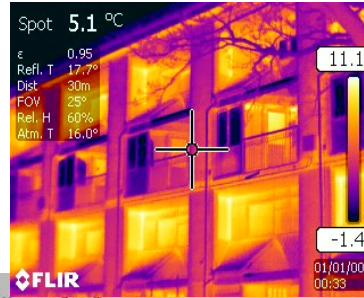
- reduce the network supply temperature down to consumer required temperature level
- heat supply can be diversified by utilisation of industrial excess heat, geothermal heat and renewables like solar thermal,
- reduced network heat loss by up to 75% comparing with the current system,
- reduced thermal stress in steel pipes and possibility to use other pipe materials,
- reduce the risk of water boiling in the network and two phase flow in pumps and other equipment.

LTDH network planning map

Sneinton Courts



Retrofitting the four Court buildings



Retrofitting the four Court buildings



Retrofitting the four Court buildings



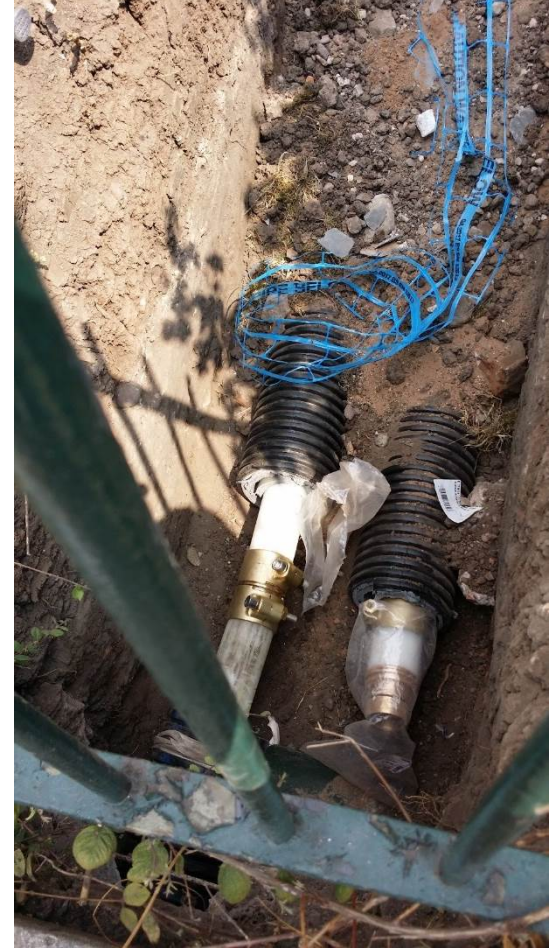
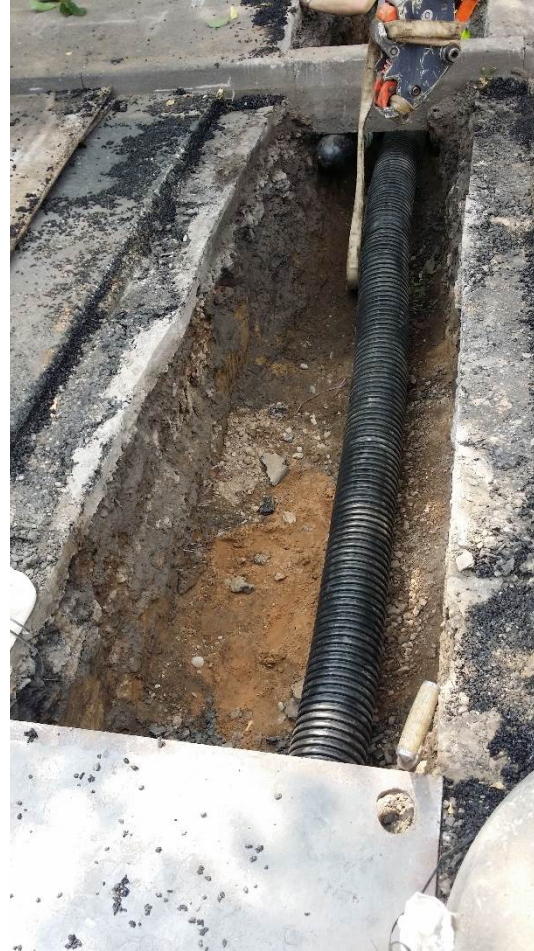
Retrofitting the four Court buildings



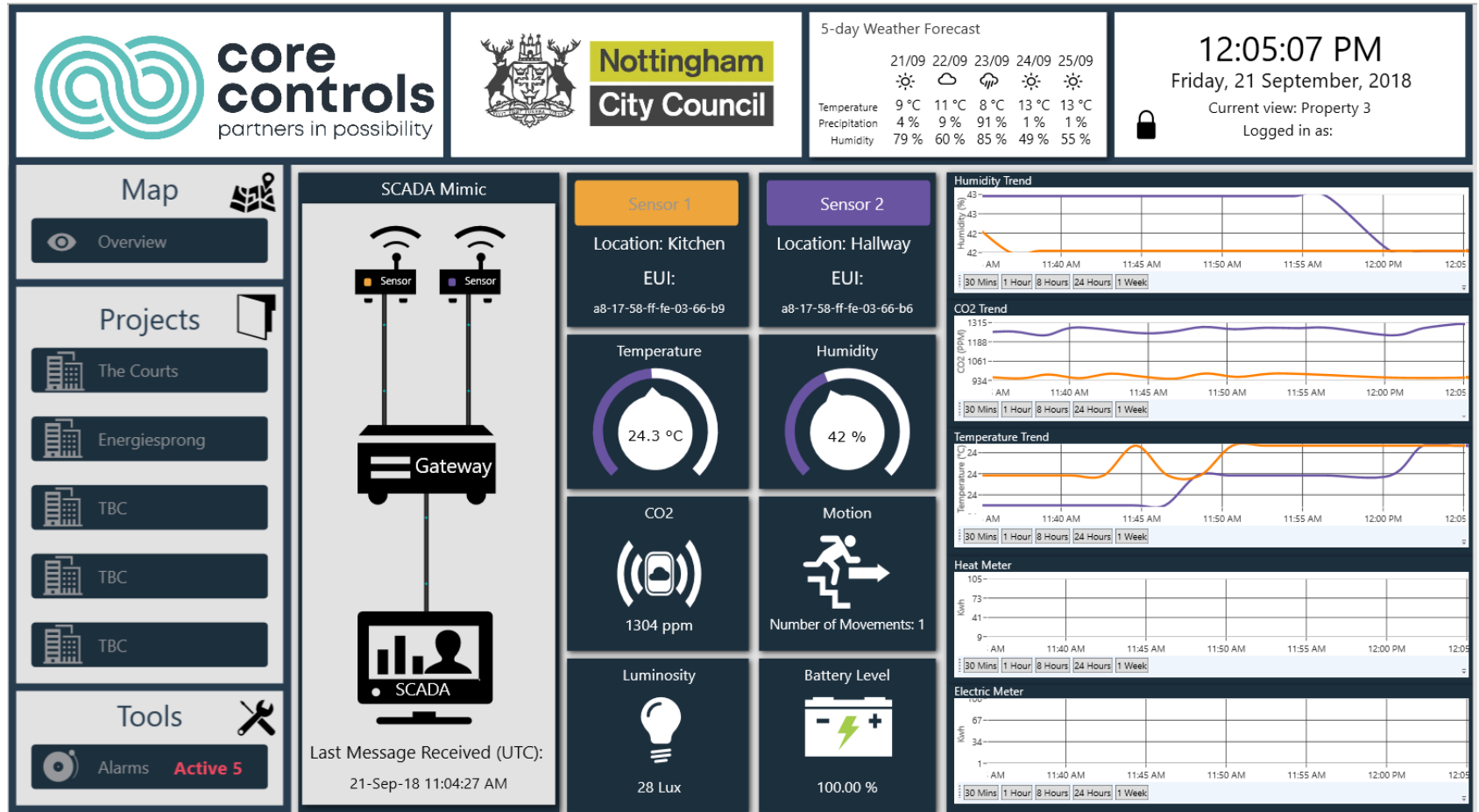
Connection to the existing DH system



Connection to the existing DH system

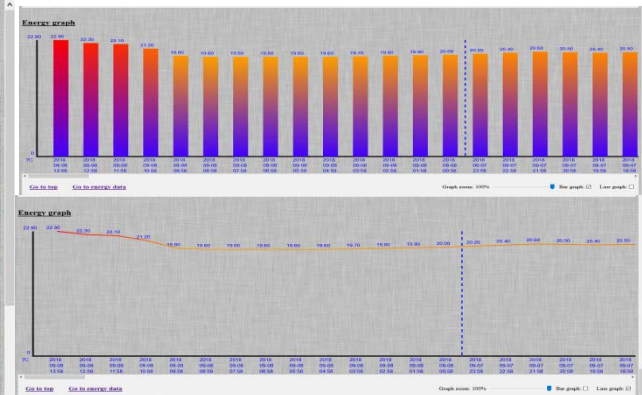


The Sneinton Courts – LTDH Monitoring and data collection



A web based Interface that provides a visual representation of energy consumption over a geographical location

- [illegible]



Map Of All Monitored Dwellings



Intelligent Control System (*Siemens MindSphere*)

The intelligent control system in each retrofitted property:

- optimise energy use and storage to suit predicted demand profiles
- allow provision of alerts and alarms for assisted living for vulnerable tenants
- energy consumption feedback for all tenants





Passive house retrofitting innovation activities – 2050 Homes



As part of the retrofitting programme it is proposed to refurbish a terrace block of 9 three bedroom **William Moss Cross Wall** houses at West Walk, Sneinton to a high standard of energy efficiency, aiming to be as close as reasonably possible to the **EnerPHit** standard.

EnerPHit recognises the difficulty of achieving a full Passivhaus standard in existing buildings without excessive cost and set slightly different requirements to the full Passivhaus standard. This will provide valuable learning for local installers.



Passive house retrofitting innovation activities – 2050 Homes

Archetype F - William Moss Cross Wall House

- Terraced properties owned by NCH.

Issues:

- The undercroft and major heat loss through the floors of the first floor of these properties.
- Significant temperature difference in the property
- Residents and surveyors report draughts can be felt coming through the walls, from behind skirting boards, as well as up the stairs from the garage.
- Close proximity of the bungalows.
- Anti-social behaviour.

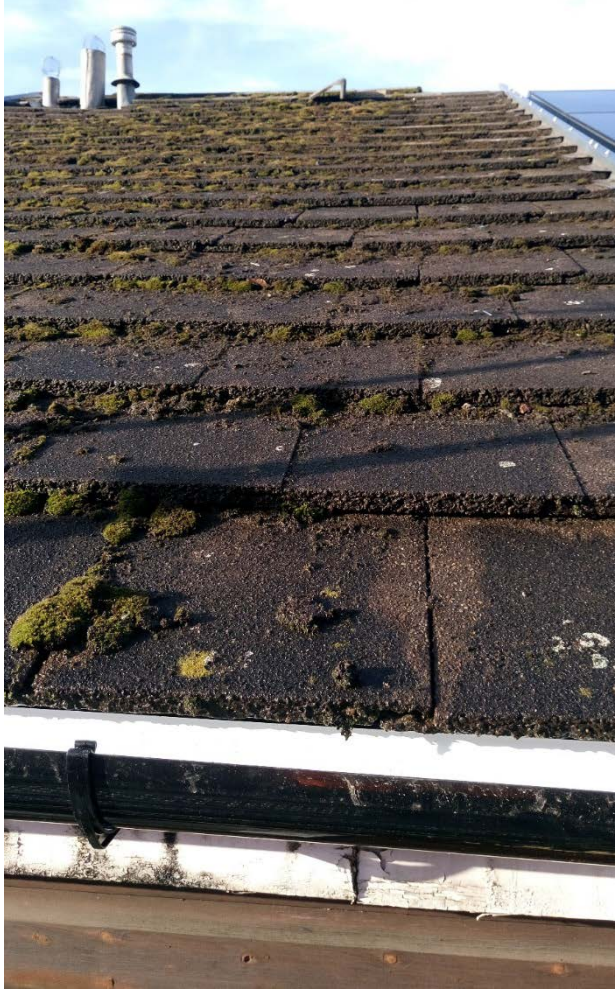


Passive house retrofitting innovation activities – 2050 Homes





Passive house retrofitting innovation activities – 2050 Homes



Passive house retrofitting innovation activities – 2050 Homes



Energy Centre– 2050 homes



2050 homes 2 ground source heat pumps onto communal network, with 2 large thermal stores, and thermal stores in each property. Fully commissioned and operational. Used as part of strategy to take homes off grid at peak times. Courts LTDH now designed to 80% efficiency.



Retrofitting the district – 2050 homes

Before



After

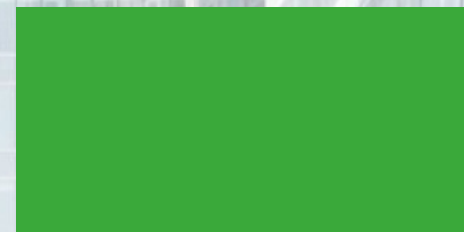


Finally a bit of fun with LTDH





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Thank you for your attention!

Nottingham Trent University



ROMOURBAN EU Horizon 2020 Lighthouse project
Nottingham Demo Site

