

ZERO CARBON RUGELEY

WP17-D11: COMMUNITY HUB DISPLAY

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The materials forming the community hub display are split into categories 1) WP17 Engagement work 2) Community voice ie, a summary of the feedback generated throughout the project 3) The SLES design output map 4) Community Centre Retrofit 5)

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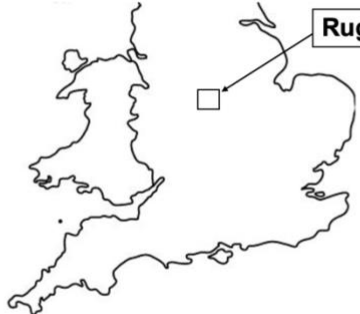
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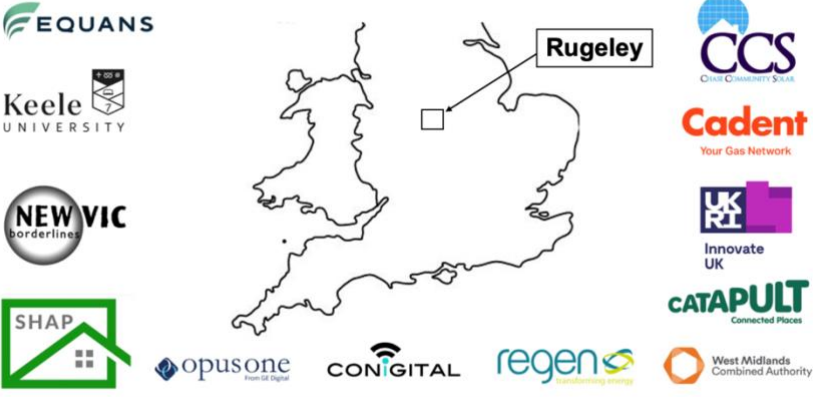
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Zero Carbon Rugeley



Rugeley





Work packages

Business Models	Energy Markets	Mobility	Buildings & Retrofit	Energy Systems	Finance & Investment	Policy & Regulation	Community hub & legacy
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User-centric Design & Community Engagement

Aims and objectives

- Deliver a Smart Local Energy System (SLES) design for Rugeley which drives carbon and cost reductions alongside the regeneration of the town and local energy infrastructure.
- From a technology agnostic starting point, develop a replicable place based SLES design for future projects.
- Use the Rugeley Power Station to catalyse the SLES design and a low carbon community.

User-centric Design

- Zero Carbon Rugeley took a 'User centric Design' approach to enable the community to engage with, and thus shape, the design of the SLES.
- The 'bottom up' approach taken within ZCR was designed to create a bespoke Rugeley SLES and facilitate continuous engagement with the Rugeley community.

Cultural Animation in Zero Carbon Rugeley

What is Cultural Animation

Cultural Animation is an art-based participatory research methodology that draws upon individual's everyday experiences. It builds trusting relationships between participants and the facilitators by inviting them to work towards a shared goal.

How does it work?

1. Single Animateur
2. Creative activities
3. Diversity of participants

Mobility through making: In person mobility workshop

Paper not floor

- Participants navigate a room covered in pieces of paper.
- Everyone to be stood on a piece of paper when the whistle blows.
- Animateur slowly removes paper.

Slow Lane Game

- Participants walk around a room and must be sat on a chair when the whistle blows.
- Animateur slowly removes chairs between whistles.

Button & Tape town design game

- Participants work in groups to re-design their town from a decarbonisation perspective using tape and buttons. Each group explains their design to the other groups.



Online Cultural Animation Workshops

Who is Rugeley?

Scavenger Hunt

- Find an object in your house that represents Rugeley and explain why.

Mapping Exercises

- Do a quick sketch of Rugeley and highlight the carbon hot spots.
- What are the barriers to net zero in Rugeley?
- How do we change the barriers into solutions?

The First and Last Mile (Mobility)

Cinquain Poem for the first mile

- Journey (trigger word)
2 words (that describe the first)
3 words (see, feel, hear, related to first word)
4 words (verbs related to first word)
1 (what has changes from the first word)
Present to the group

Accompanying questions

- What does this tell us about transport in Rugeley?
- What are the positives and negatives?
- What are the differences in peoples responses?

Sustainable Housing (Retrofit)

Character of your house

- How old is it?
- Where does it get its energy from?
- Is it a healthy house?

Can you improve houses in Rugeley?

- What would you do?
- Where are the problem areas?
- Who could help you to make this a reality?

Retrofit in Rugeley

- What are the short-term disruptions to getting a healthy house?
- What are the long-term benefits?

User-centric Design: Community Engagement

Community Engagement Key Objectives

- 1 Provide insights from the Rugeley Community into the SLES design
- 2 Support the development of a shared vision and design of the SLES
- 3 Catalyse a 'SLES-ready' community within Rugeley
- 4 Support the different work packages in work with the community
- 5 Increase general community understanding of SLES components

Why UCD?

- Participatory community engagement approaches build deeper relationships and trust between project teams and communities.
- Place-based approaches support co-production through longer processes of engagement and support an ethos of 'doing *with*' rather than 'doing *to*' the community.
- Places value on local contextual knowledge.

Key Learnings From UCD

- Need for a dedicated engagement team to act as intermediaries between the consortium and the community.
- Variety of methods reach a wider audience.
- Respect boundaries and time of community members.
- Sustained engagement is required to build community trust.

Community Engagement Phases

Initial 'set up' phase

- Stakeholder Mapping.
- Consortium workshops developed understanding of work package needs.
- Community engagement strategy developed.

Phase 1: Exploration

- Delivered 15 online Cultural Animation Workshops.
- Facebook engagement with 170 community members.
- Established Community Gatekeeper and Community Ambassadors groups.

Review Phase

- Engagement report of community insights informed the focused engagement in phase 2.

Phase 2: Focus + Addressing issues

- Mapping Mobility Action Project.
- Community Energy & Heritage Day 2021.
- Smart Retrofit online cultural animation workshop.
- Mobility cultural animation workshop.

Phase 3: Leaving a legacy

- Pop-up activities in community spaces.
- Community Energy & Heritage Day 2022.
- Rugeley Energy Heritage Performance Walk.
- Lessons Learnt Workshop.
- Net zero champions training course.

Exploratory Phase

Aim: Initial scoping work.

Setting up Community Groups

Community Ambassadors

- Residents who wished for significant involvement in the project.
- Testbed for engagement plans and project awareness.
- Regular communication with Community Engagement team.

Community Gatekeepers

- Individuals from diverse organisations local to Rugeley.
- Supported ZCR's visibility and built trust between the project and community.
- Provided access to their local networks.
- Monthly / bi-monthly online meetings.

Online Cultural Animation Workshops

Who is Rugeley?

Focused on the local component of SLES, understanding community perspectives on energy, their proposed barriers and solutions, where carbon is emitted in Rugeley and how ZCR could address carbon emissions.

The First and Last Mile (Mobility)

Aimed to understand residents' current methods and patterns of mobility to discover what solutions could be effective in Rugeley.

Sustainable Housing (Retrofit)

Participants personified their house, thinking about how it consumes energy, how it loses energy, and what could make the house 'healthier' from an efficiency perspective.

Social Media Engagement

- Two-way interactions engaging the Rugeley community at their own pace.
- A dedicated ZCR Facebook page and discussion forum was used for:



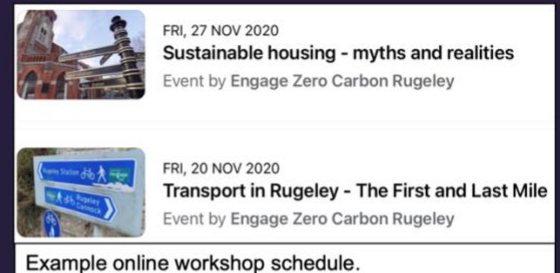
Zero Carbon Rugeley Facebook Page

Data collection:
Posting questions for community members to discuss in the comments



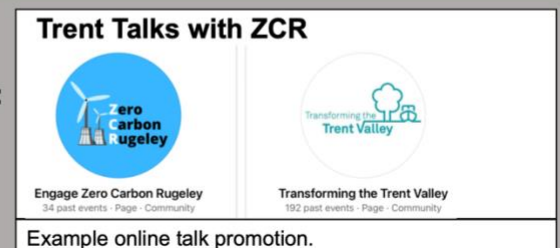
Example Facebook post.

Workshop Promotion:
Sharing upcoming events and workshops



Example online workshop schedule.

Community Networking:
Hosting online talks with other local projects



Example online talk promotion.

Focused Phase

Aim: Review phase leading into community insights and addressing issues from phase 1.

Mapping Mobility



- Active Travel App
- Participants record their journeys
- Take photos of mobility issues, such as blocked pavements.
- Provides insights into Active Travel journeys and issues.



Cultural Animation Workshops

Smart Retrofit

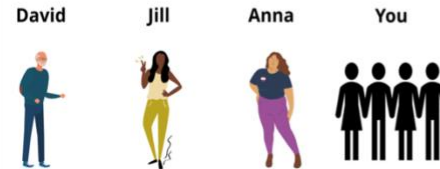
Online workshop taking participants on a 'retrofit journey' through a series of characters undergoing the process.

Mobility through making

In-person workshop involving participants designing a low carbon town with buttons and tape.

Smart Home Energy Improvements Workshop

Meet the characters



Social Media Engagement

In 2021 a new social media manager position was created to produce informative content to support online data collection exercises and information flows.

'Fabric' Retrofit vs 'Smart' Retrofit

Fabric

Focuses on keeping the heat in the home.



Improves the 'fabric' of the building such as insulation and windows.



Improves how 'air tight' your home is to make sure heat is not escaping.



What needs to be done will vary depending on how well insulated and draft-free your home already is.

Smart

Focuses on improving energy usage and efficiency



Monitors energy usage to see when you use energy so that energy can be bought at the cheapest time.



Different 'levels' of control. The highest level could switch off appliances when they are not needed.

Retrofit

We would like to know...

"How long would you expect a full retrofit of your home to take?"

Let us know what you think in the comments below! Or email us at: X0d06@students.keele.ac.uk



Rugeley Community Energy & Heritage Day 2021

Full day of activities engaging 150+ at a local theatre including:

- Project updates
- Local historian presentation
- Expert energy talks
- Drop in feedback sessions
- Kids' sustainability cinema
- Community Group Networking
- Local Business Networking



Cooling towers 'Energy Arts' Display

IZCR: Engagement & Legacy

Aim: 'Implement' Zero Carbon Rugeley following evaluation during Focused Phase.

'Pop up' Engagement

Easing of COVID-19 restrictions allowed for engagement to take place through 'pop-ups' in community spaces.

Level 1 Activities

Quickfire questions to passers-by aimed to capture their attention and provide shorter engagement opportunities.

Level 2 Activities

More detailed questions themed around buildings, energy, and mobility, with participants using props to answer questions.



ZCR 'pop up' stall at an 'ECO Day'



ZCR 'pop-up' stalls at the Rugeley Artisan market (left) and Jubilee street party (right)

Rugeley Energy Performance Walk

Energy heritage walk exploring Rugeley's Past, Present, and Future of energy through an interactive performance conducted by New Vic Borderlines facilitators. The route took 19 community members on a journey through Rugeley Town to the Power Station site.



Photo taken during the Performance Walk along the canal tow-path

Net-Zero Champions

- Energy & Carbon literacy training course created to catalyse a SLES ready Rugeley Community.
- Designed to be peer delivered so that local community groups can take on the 'trainer' role within Rugeley and the wider community.

Course outline

Session 1: Energy & Carbon literacy

Session 2: Domestic energy efficiency

Session 3: Domestic energy generation and storage

Session 4: Low Carbon Travel

Session 5: Community Energy Futures

What's next for Rugeley?

We have wanted to ensure a legacy for Rugeley to keep the conversation going.

Net Zero Champions 'Train the Trainer' Course

Upskill community members to deliver net zero training using local groups as a vehicle to carry forward the SLES ready community.

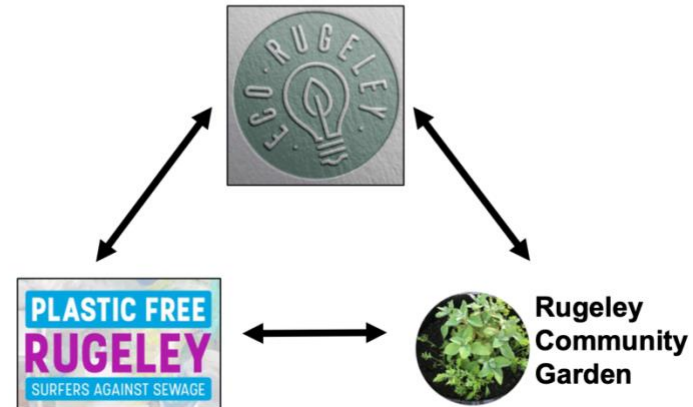


Retrofitting the Community Centre

- ZCR has undertaken a retrofit of the community centre, installing cavity wall insulation, solar PV, and an LED display showing the generation of the solar PV and consumption of the building.
- The Community Centre as a hub for residents and businesses to see the benefits of retrofit and access information about the process.
- Thermal camera training sessions delivered by project partners to Ambassadors group and local community groups.

Eco Rugeley

Eco Rugeley is a local community group that was formed by members of the ZCR Community Ambassadors Group. The group has now merged with other local groups to collaborate on projects together:



Eco Rugeley Activities

This new group now meets once a month at the Rugeley Community Garden, this year activities have included:

- Eco Arts Workshop.
- How Bad are Bananas Zero Carbon Session.
- Half Term children's gardening session.



What's next for place-based decarbonisation and User-centric design?

Future projects

Keele University will be working with Zero Carbon Rugeley consortium partners on two upcoming place-based decarbonisation projects:



**West Midlands
Combined Authority**

Dudley to develop first Net Zero Neighbourhood in the West Midlands

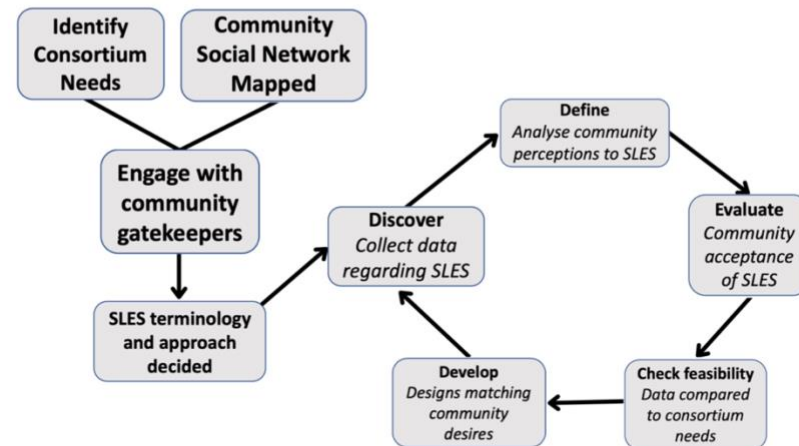


**UKRI
Innovate UK**

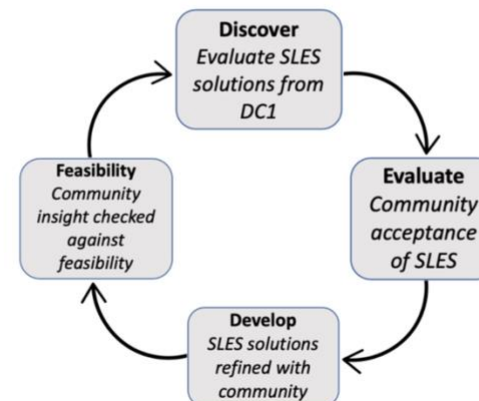
**Staffordshire
Net Zero
Living**

Zero Carbon Rugeley has produced a replicable community engagement approach to take forward in other place-based decarbonisation projects. This UCD approach includes two distinct Design Cycles:

Design Cycle 1: Exploratory phase



Design Cycle 2: Evaluative Phase



Rugeley Performance Walk 2022

Lichfield Festival Fringe Event



"The cooling towers were like a landmark as well, speak to anybody who lives in Rugeley, they'll say, whenever they've been away, they'll always know they're near home when they can see the cooling towers".

Map Key

- Elmore park
- Walking route
- Ravenhill park
- Driven route
- Power station lake

Project Timeline

Exploratory Phase 2020 - 2021

March - April - May

- Zero Carbon Rugeley begins.
- COVID-19 pandemic restricts in-person engagement plans.
- Stakeholder mapping commences.
- Community engagement strategy designed.

June - July - August

- Established Community Engagement Delivery Group consisting of representatives from each consortium partner.
- Asset mapping completed.
- Cultural Animation engagement activities adapted for online workshop use.

September - October - November

- Established Community Gatekeeper Advisory group.
- Significant social media engagement with 170 individuals interacting online.
- Designed and hosted 9 online Cultural Animation Workshops with New Vic Borderlines.

December – January - February

- Established Community Ambassador Group.
- Hosted a further 6 online Cultural Animation workshops with New Vic Borderlines.
- Built working relationship with local Primary School.
- Connected with a range of local community groups.
- Conducted 5 stakeholder interviews.

Focused Phase 2021 - 2022

March - April - May

- Completed analysis of Exploratory Phase insights.
- 'Next steps' session with all work packages to match consortium needs and community insights.
- Refined engagement strategy.
- Community Ambassadors review engagement strategy.

June - July - August

- Easing of COVID-19 restrictions allowed in-person Cultural Animation Workshop pilots to be conducted with New Vic Borderlines.
- Social media engagement expanded through creation of social media manager position.
- Mapping Mobility ACTION Accelerator project.
- Community Ambassadors form Eco Rugeley group.

September - October - November

- Hosted Rugeley Energy & Heritage Day involving talks and community networking, engaging 200+ people.
- Significant social media engagement around mobility and retrofit.
- Mobility Futures Workshop in-person and online.
- EV Futures and Smart Solutions in the home online talks delivered by Dr Richard Waller

December - January - February

- Smart Retrofit online Cultural Animation workshop delivered.
- Mobility & Heritage reports drafted from Energy Heritage engagement activities.
- User-centric Design key learnings report drafted.
- 'Pop-up' engagement activities planned.

Legacy Phase 2022 - 2023

March - April - May

- 'Implement' Zero Carbon Rugeley project phase begins.
- 'Pop-up' ECO Day event at Rugeley Community Center, inspired by ZCR Energy Day 2021.
- Collaborated with local historian group to plan Energy Heritage Performance Walk.

June - July - August

- 'Pop-up' engagement activities completed at Rugeley Jubilee Street Party and Artisan Market.
- Delivered Energy Heritage Performance Walk engaging 19 participants.
- Project dissemination at two Keele conferences.

September - October - November

- Hosted 2nd Rugeley Energy & Heritage Day involving talks and community networking, engaging 150 people.
- Project dissemination at Uttoxeter Climate Expo.
- Hosted two 'Lessons Learnt' sessions, one internal with the consortium and one with the community.

December - January - February

- ECO Rugeley collaborated with existing Rugeley groups to run monthly activities.
- Completed pilots of 'Net-Zero Champions' training course with Keele students and Rugeley community.
- 'Clean air masterclass' delivered to local school.
- Planned community display of project findings.

Key learnings from the Rugeley Community

Diverse reactions to the project:

1. Excited / opportunistic
2. 'Skeptics' = Interested but aware of challenges.
3. 'The non-engaged' = decarbonisation is the problem of 'others'
4. 'The Objective' aware of challenges but value the projects' purpose.
5. Uninterested (no data)

Need to develop community understanding

1. Identifying and addressing misinformation.
2. Barriers to retrofit – aesthetics and trust rather than simply cost.
3. Importance of building trust in the community to encourage uptake.
4. Bringing the diversity of the community to the notice of the designers.

Mobility

1. Walking infrastructure is insufficient.
2. Trent Valley station only caters for cars.
3. Bus service is too infrequent with limited routes.
4. Community gardens
5. Cycling infrastructure is insufficient causing conflict with other road users.
6. Rugeley is 'car-centric'.

Perceptions of the energy transition

1. Closing of power station has made the air cleaner.
2. RET made from unrecyclable materials.
3. Opportunities for solar PV, wind, and hydro generation.
4. Community energy is a postcode lottery.
5. Invest in nature and wildlife to improve environment and sequester carbon.

Acknowledging community concerns

1. Loss of mining heritage and of power station as a key employer.
2. Becoming a 'commuter town'.
3. Lack of local jobs, closure of shops.
4. Increased traffic from the development.
5. Lack of trust; not being listened to.

Acknowledging community priorities

1. Places to socialise and spend time in the town.
2. Public spaces and cafes.
3. Spaces for events.
4. Community gardens.
5. Bringing nature into town, picnic benches.

Buildings

1. Fabric first retrofit to reduce energy consumption.
2. Less digitally engaged may struggle with smart technologies.
3. Cost is a barrier, alongside aesthetics and disruption.
4. Lack of knowledge regarding where to start with retrofit.
5. Pay-back periods are a motivating factor.

2) Community voice

Active Travel

(Electric scooters) Not needed and will cause more work for the police like in other places.

The cycle lane along the bypass by amazon is so bumpy that no-one uses it. I don't blame them either

Supermarkets need places to lock bikes up – locks on Brook Square.

The cycle lanes in Brereton are always used as parking bays. Perhaps something could be done to stop this.

I have an electric bike, needed the extra help. Good to get from one job to the next, love my bike.

Get rid of diesel cars, stinks in a morning walking to work.

I would love to get an electric bike, but they are too expensive.

An electric scooter could be an option with my local sandwich deliveries

As for walking in Rugeley the town is a valley. Whilst a lot of people live in flat areas a lot do live on the surrounding hills.

A lady on a mobility scooter told us that using access routes around Rugeley was very difficult due to overgrown hedges and debris

Trying to walk down Hednesford Road with little ones is a nightmare with all the bushes getting in their faces.

The footpath from the end of the bypass down to Wolsley Bridges is absolutely disgraceful. The surface is broken up and overgrown.

A cycle lane on Hednesford Road would benefit everyone that uses it

Cycling around Rugeley the bike lanes stop and start on and off pavements and are often obstructed by cars and on pavement parking

Private Vehicles

Enough spaces for 2 cars and roads big enough to drive downside by side.

New estates like Thorn Close are a disgrace with cars parked everywhere. How are emergency services supposed to get through?

Only electric vehicles allowed on Horsefair to reduce pollution and traffic jams

If we are going to move to electric cars you're going to need those charging points and national infrastructure both out in the public realm as well.

An alternative route in and out of Pear Tree estate would ease traffic at Queensway - sandy junction and have a knock-on effect at Globe island.

Pear Tree Estate junction, there is enough pavement to allow cars to head towards Hednesford which would alleviate congestion at that point

I use the new ones (EV charger) at Rugeley Tesco when shopping just because who doesn't like free charge?

Catkin Walk it's a nightmare now for parking down the bottom of it and all cars - get rid of some of the grass and make more parking, as no-one uses it

Big buses around estates are never full, why not use minibuses? Ask bus users to count the people on their buses to allocate routes better

Reintroduce the Stafford to Rugeley bus service.

No conductor on bus/train - Don't feel safe

Surely now is not the right time, public transport is only seeing around 55-60% of its normal capacity due to covid

Re-design bus station

Public Transport

Need more regular buses

No buses to the chase

Trains not frequent enough

No covered or warm waiting room at the train station a problem when there's long waits between trains

Buses and trains are unreliable and

Connect bus and train timetable

A good bus service to get cars off the road, it would generate a more friendly and sociable environment.

Heritage

Well the coal industry right, that's more recent, it was a market town originally

When it was a pit and you got thousands of men all working and doing the same job there was that sense of community there. So, people knew each other. Everybody knew each other. It was like "oh, you know so and so" yeah, we know him. It was that everybody knew everybody.

We don't have any mines here anymore, and erm there's power station road, well we don't even have the power station anymore. So you've got those modern equivalents of Forge street.

Not only that Rugeley's felt, but everywhere that's a mining industry town across Britain unfortunately. That sense of community is not there anymore.

These are our ancestors you know some people born in Rugeley, they've got generations going back that worked in these industries and agriculture and things so its nice to see a bit of history still existing in effect

I do feel though that there's been a resurgence of the sense of... if not community, a want to feel community and a want to identify Rugeley as its own entity. Rather than being subsumed by Cannock.

I think the canal played a big part though with how people were able to trade. So, it was sort of a point where people could sell their goods in town. So, it was a market town originally.

The cooling towers were like a landmark as well speak to anybody who lives in Rugeley, they'll say, whenever they've been away, they'll always know they're near home when they can see the cooling towers.

Yeah, it is that sense of community. So, people go out and they work in different areas, in different industries and every different group of people. So, then you meet, obviously you make different friends, so then you join different social groups.

I think it's a shame that we don't know more about it you know (Rugeley's history), we don't make more of it as a town.

But it's also an opportunity for regeneration and progress on the flip side of it. You've got to balance it out, haven't you? Yes, things might have gone. Yes, there's a rich history. But there's opportunity, there's growth.

I'm not really aware of the Mills and stuff like that even though I've walked past it. And I kind of know it's a mill but don't think about it as it being history of it, I think it's a bit sad that we don't make more of it.

Homes in Rugeley

My son put a Hive thermostat in and my credit with Octopus energy at the end of 12 months was over £200 so now reduced by DD.



My mums house used to be a butchers when they moved in in the early 70s it was you still got the meet hooks on the ceiling.



I know some folk who have their central heating on 24 hours a day - yes - even when they're in bed.. They have their thermostat on 22+.

I set my appliances to come on at the cheapest times. Works really well for me and halved my bills.



I changed all my lights to LED; you would be surprised how much energy normal bulbs use.



We have a smart meter. Shoots straight in to the red every time we put the oven on. Am more conscious of electric usage.



Our house front and back is timber framed and thermolite bricks as insulation. We lose all the heat through those walls. We need to know of a better way to insulate said frames.

Fortunately, the roof is very well lagged. The walls have cavity wall insulation, and the rest is double-glazed with heavy lined curtains. Even the letter box has a strong spring to stop it opening in the wind.



I can control almost every radiator in my house just by my phone.



Heating, old house, no insulation in walls (double brick, no gap) or loft (don't qualify for free).



I would also say that simple things like getting any single glazing upgraded to double or getting lofts insulated also make a big difference in large or older places.

Views on Retrofit

There will be a massive housing estate built on the power station. Insist that they are built south facing so that they get the sun all day, solar panels, rain collection pumped to a tank in the roof. This tank then feeds the toilets and outside taps.

I would like to change our heating source. I think there's so much embedded carbon that we wouldn't change the boiler right now, but when it needed to be changed. We'd change it to, I don't know, ground source or something.

Lobbying the government for higher building regulations would be good for new ones. Tightening the loopholes that allow some landlords to not push buildings to better EPC levels

Normally like retro means something old and I'm not sure whether or not people think that, with this, retrofit its old technology that we are going to use so I am just wondering whether or not there's a better way describing this.

I think there's an advantage in being able to divert some loads to night time when the cost is cheaper so I'd be interested in doing that, the system would need to know when I needed the dishwasher to run or the washing machine to run kind of thing.

The technologies are all available in terms of insulation and more environmentally sustainable heating approaches. But of course, there is insufficient incentive for individuals to pay for quite expensive measures. I suppose my broad answer is that these are social and political issues more often than technical.

If they were to take the responsibility of the cost and the responsibility for saving and if they are so sure that it will work then why wouldn't they do that if somebody was to come and do that I wouldn't want to make a penny literally wouldn't want to make a penny.

Solar panel projects can be good when rows of terraced houses go in together as there can often be a combined cost saving

One of the problems is the disruption, I know there is probably a bit of a push now on like under floor insulation and that may well save us money and make some savings on carbon, but just trying to move everything out of the house so that you can get the floorboards up, it's a big disruption.

If you strip it completely you completely forget about the culture of the area, so important landmarks like the mill you know do what you can to preserve to retrofit to keep them going.

It's better to do that than knocking them down because this will always retain its character no matter what you do with it, still got the date of when it was built and all of the different and unique aspects of it that you never see anywhere else. So, it is retaining that history.

It's like it's been sanitised hasn't it energy, we have lost that connection to the source, in the same sense we have with food, food it just appears in the in the supermarkets doesn't it you are not people aren't going to farms and seeing how these things are grown or bred or slaughtered so yeah quite detached from a lot.

You could put a big wheel in the trent to generate electricity, maybe somewhere around the site of the old Colton Mill

Air has gotten cleaner (since closing of the power station)

All large businesses that exist and will come to Rugeley to agree to place solar panels on their buildings. Bring in the green new deal and the government green agenda. They can advertise they are doing this - any big company should see it as part of their branding exercise

This is the problem though, we're ignorant to it (energy). We expect turn on something on and it works. And we don't worry too much about where it comes from and the impact that has. You just assume.

This is the problem though, we're ignorant to it (energy) . We expect turn on something on and it works. And we don't worry too much about where it comes from and the impact that has. You just assume.

I used to get the train from Hednesford into Birmingham in the morning and you see this incredibly long coal waggon/train going up to the power station. And it was 10s of waggons of coal in the morning.

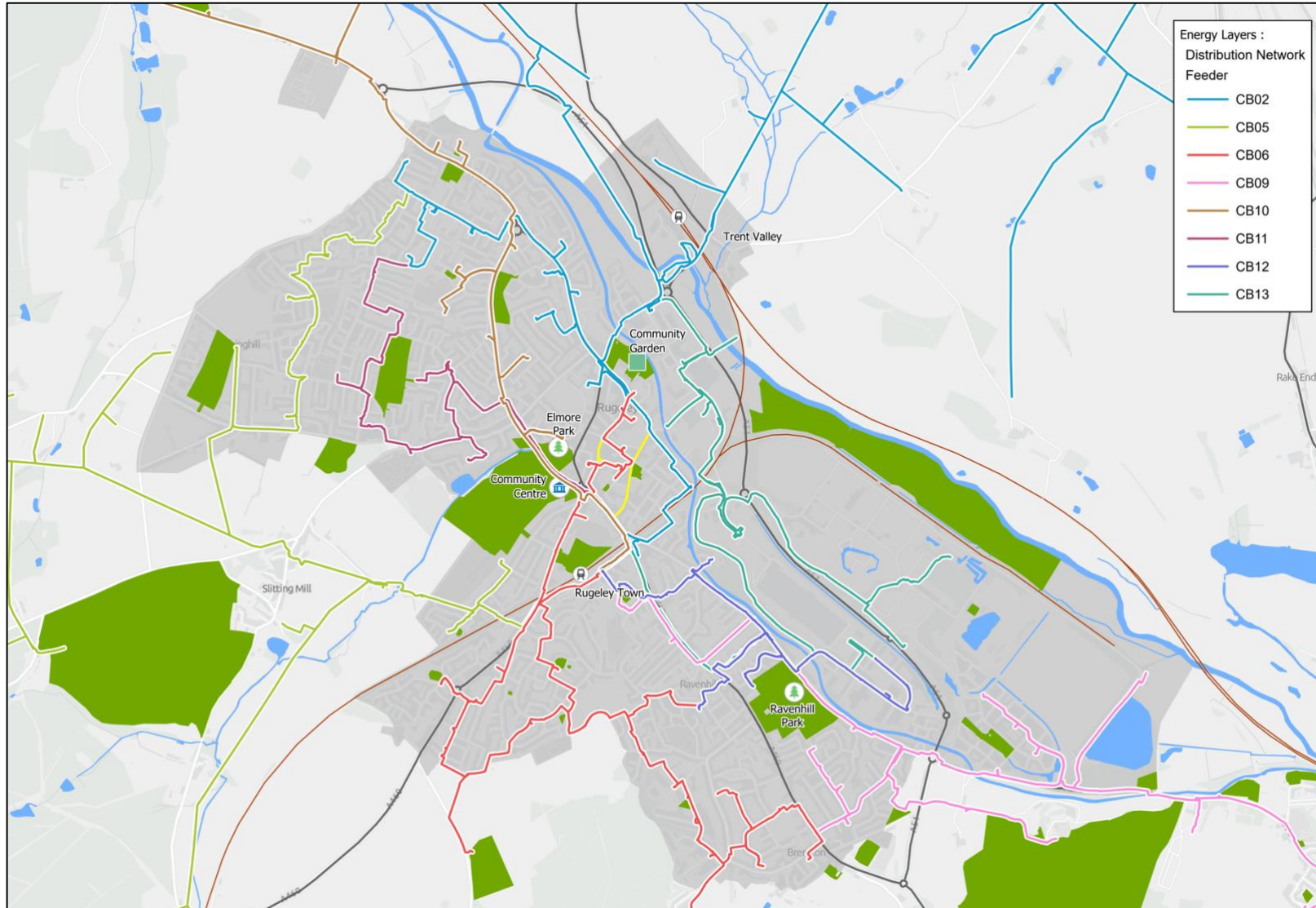
It all goes into the National Grid. So, everybody that generates electricity, it gets sent to the grid and then the grid utilise that and feed all the homes around. But it's kind of, like I say, it's diverse now. Whereas before, we all knew.

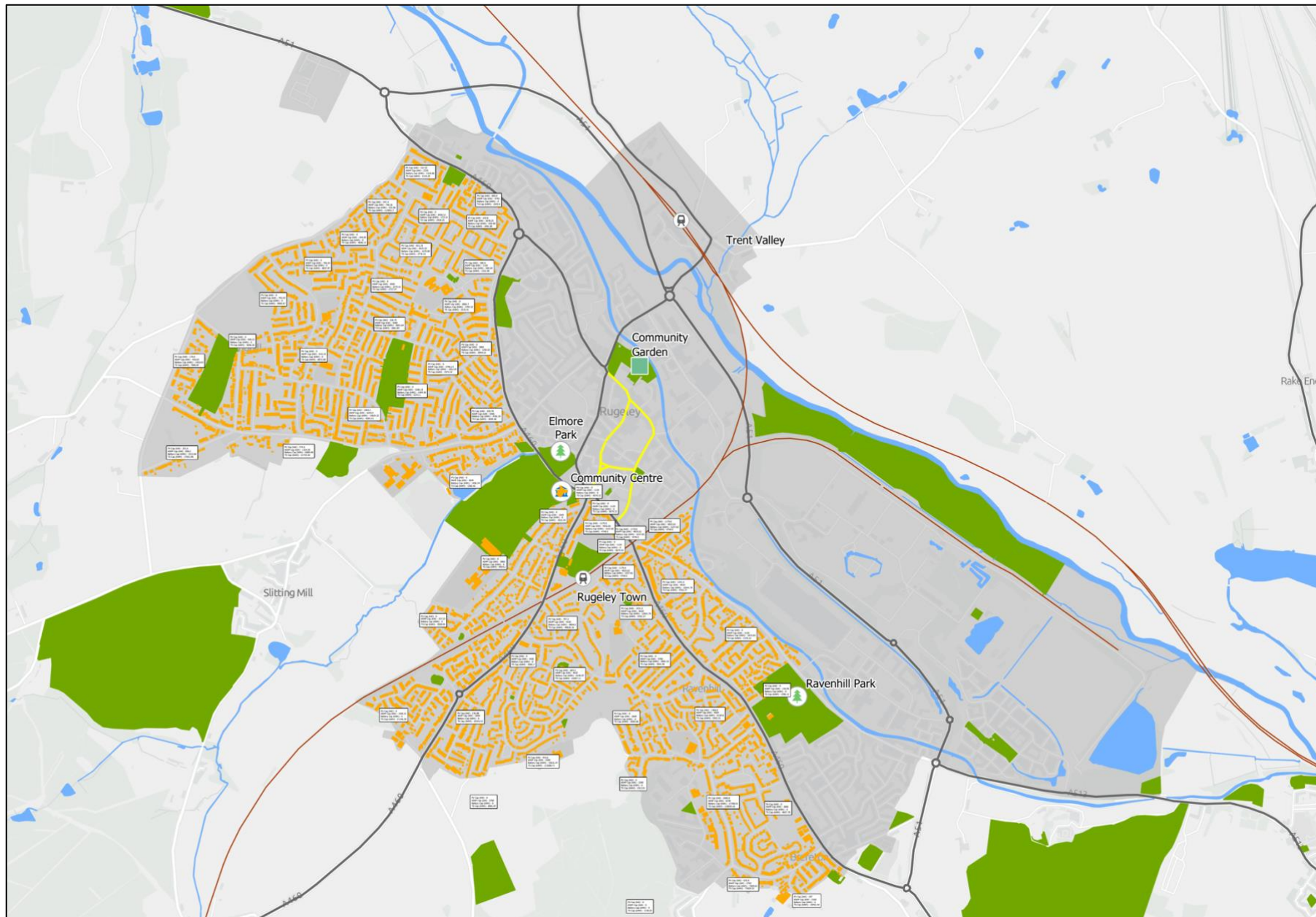
Energy

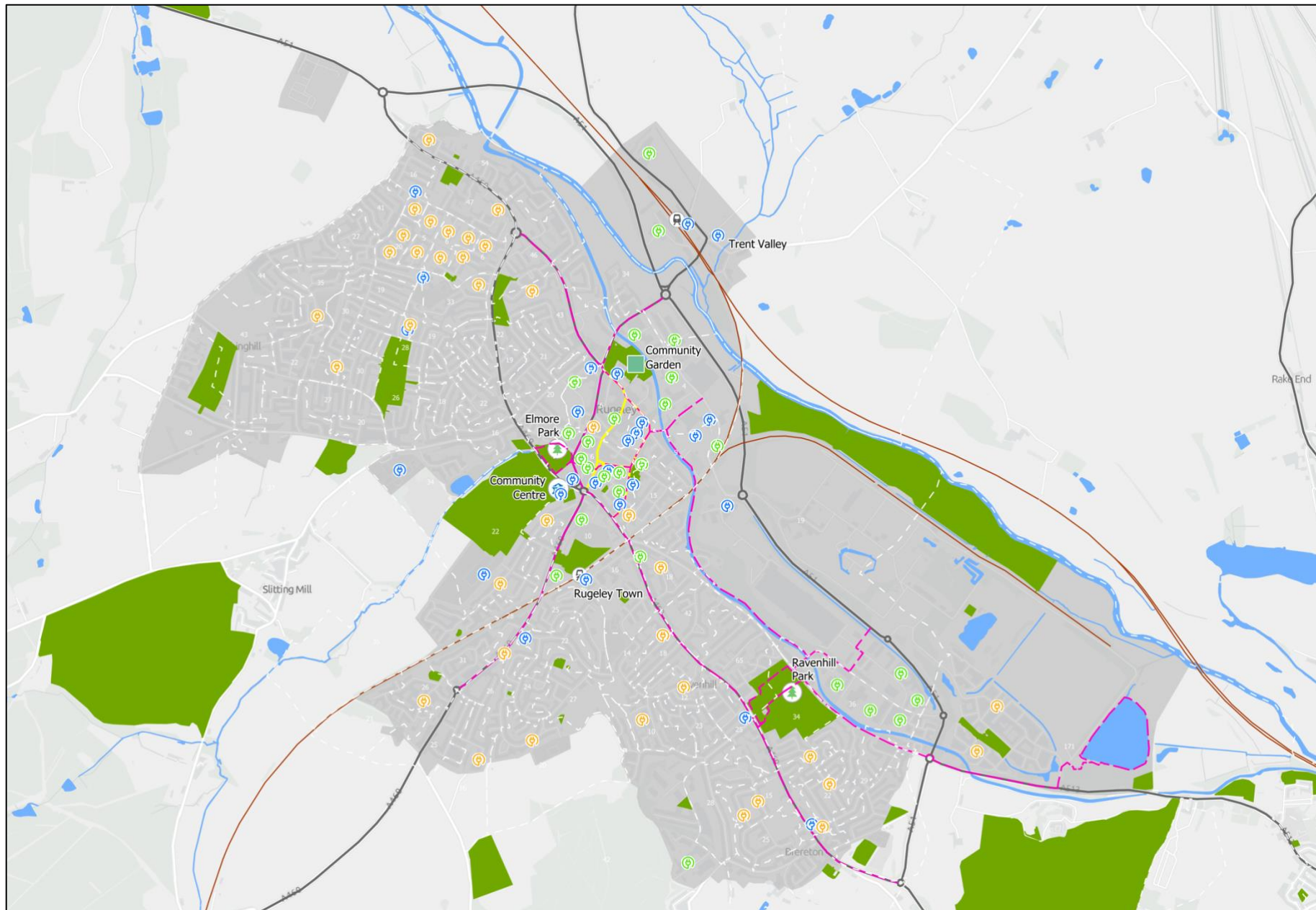
People are more conscious now because of bills going for instance. It's becoming...you're money conscious about having switches on and things like that.

Think it would be good if we could become more energy independent especially looking at what's happened this year, so I don't think we buy a lot directly from Russia, but other countries do, and when they start buying from our suppliers, the price of energy skyrockets, so again if we could bring it more to a grassroots local independent energy.

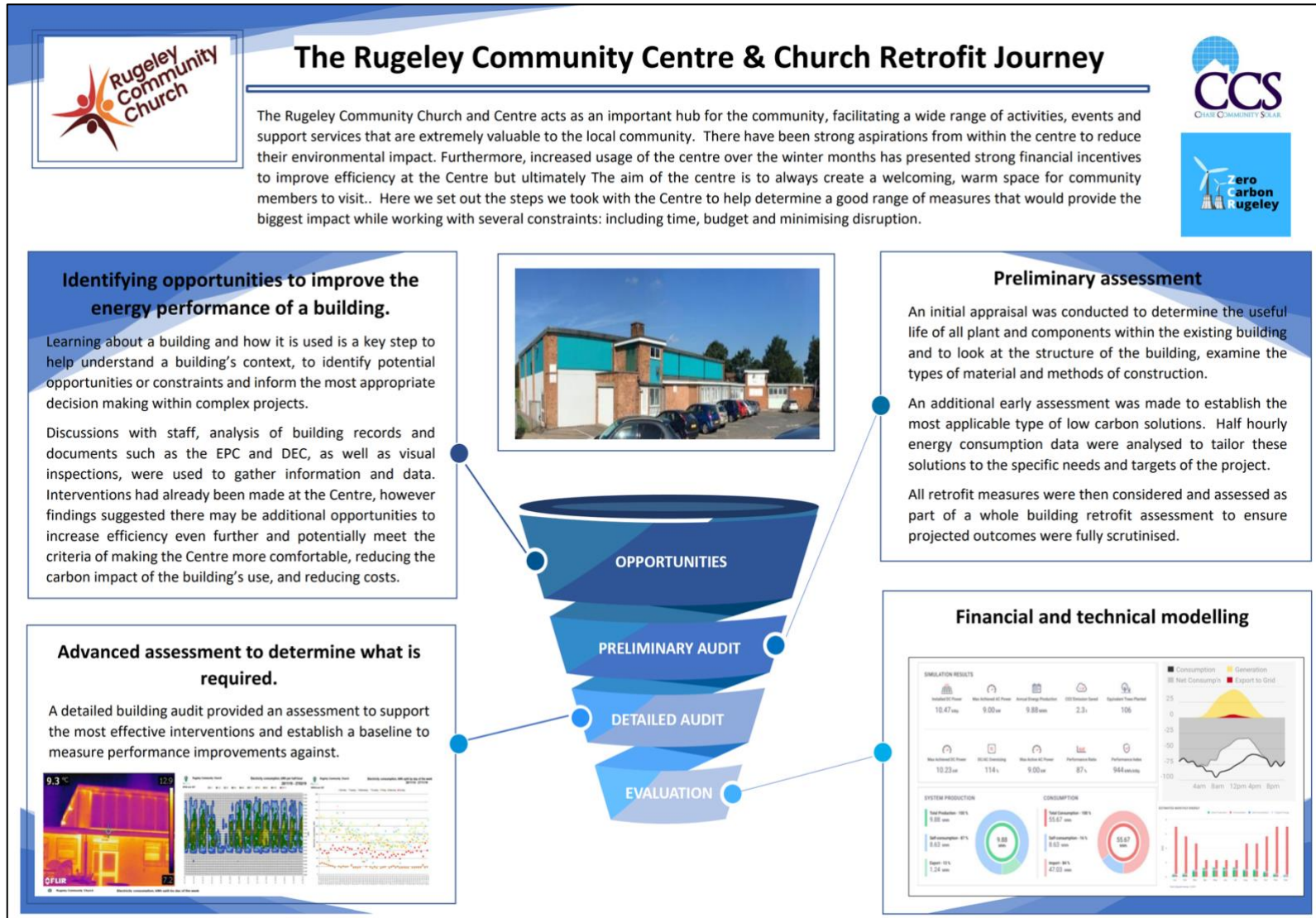
3) SLES design output map







4) Community Centre Retrofit



Fabric First Approach

The heating and heat loss analysis reports validated the information provided by Chris Fielding (Manager) and Dave Webb (Facilities) that the building wasn't fantastic at retaining heat. It also provided data on several potential retrofit interventions as follows:

Intervention	Capital Cost	Existing	Proposed	Savings	
	£	U-Value	U-Value	kWh	£
Insulated Overlay Roof	55,000	2.5 W/m ² K	0.18 W/m ² K	15,500	4185
Cavity Wall Insulation	3,500	2.2 W/m ² K	0.55 W/m ² K	5,100	1377
New Double Glazed Windows	2,500		1.8 W/m ² K	2,000	540

The business case for cavity wall insulation was overwhelming; the capital cost of an overlay roof was prohibitive. Data relating to glazing validated the centre's plans to complete the installation of double glazing and we commissioned the wall insulation work.



Heating

The largest benefit, in terms of carbon reduction, was projected to be the replacement of the old, gas fired boiler. CIBSE modelling confirmed an air source heat pump with a capacity of between 45 kW and 68 kW would be sufficient to provide heat for the centre.



The associated costs of £40,000 and unknown works needed internally to improve heat distribution unfortunately meant this wasn't possible within the scope of this project but remains an option for 2023.

Onsite Renewables – Solar PV

The roof of the gym is well suited to support a large PV system (90kW). However, market conditions mean that systems have to be scaled quite closely to match onsite consumption. A 10kW system was therefore recommended and subsequently installed. Ninety percent (90%) of generation is expected to be consumed by the Community Centre and Church reducing demand for grid supplied power by 8,500 kWh and reducing annual bills by £1250.



Community Energy and Renewable Power Purchase Agreement (PPA)

Southern Staffordshire Community Energy (SSCE) arranged the installation and will operate and maintain the system. Electricity is now purchased, at a discounted rate, from SSCE via PPA so along with the reduction in carbon intensity and the financial savings, Rugeley Community Centre & Church are contributing to a Community Benefit Fund providing positive feedback into the local community.

Energy Monitoring – Generation and Demand

The Centre is a hive of activity throughout the week. It is therefore quite difficult to monitor consumption at a granular level and gain a full understanding of the impacts of different activities and appliances.



Automated lighting through PIR sensors has demonstrated the efficiencies that technology can deliver. Along with ongoing monitoring of the PV array, demand will also be monitored through a Wii Bee system. This will track consumption through several circuits and highlight further efficiency savings through automation or human behavioural change.

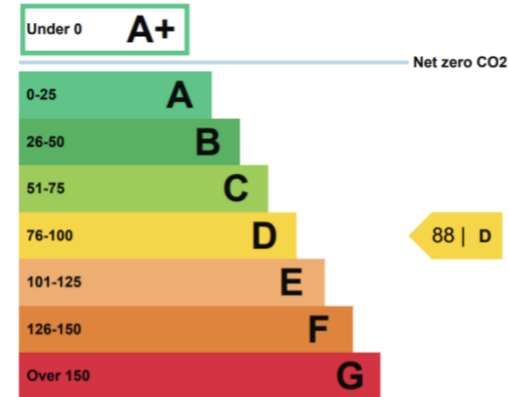
5) Retrofit modelling physical display



This house has an EPC rating of D, which is the average rating of all homes in the UK! An EPC indicates the energy efficiency of a building, taking into account the building materials, heating system, and insulation.

Energy efficiency rating for this property

This property's current energy rating is D.



Properties are given a rating from A+ (most efficient) to G (least efficient).