SCENe

Sustainable Community Energy Networks

We work with Innovate UK

ERA ENERGY RESEARCH ACCELERATOR

Project SCENe at the Trent Basin

Putting the community at the heart

Dr Lucelia Rodrigues, University of Nottingham

University of Nottingham UK | CHINA | MALAYSIA

AT Kearney

SMARTKLUB Empowering Cities Together

SOLAR READY

Loughborough University

blueprint

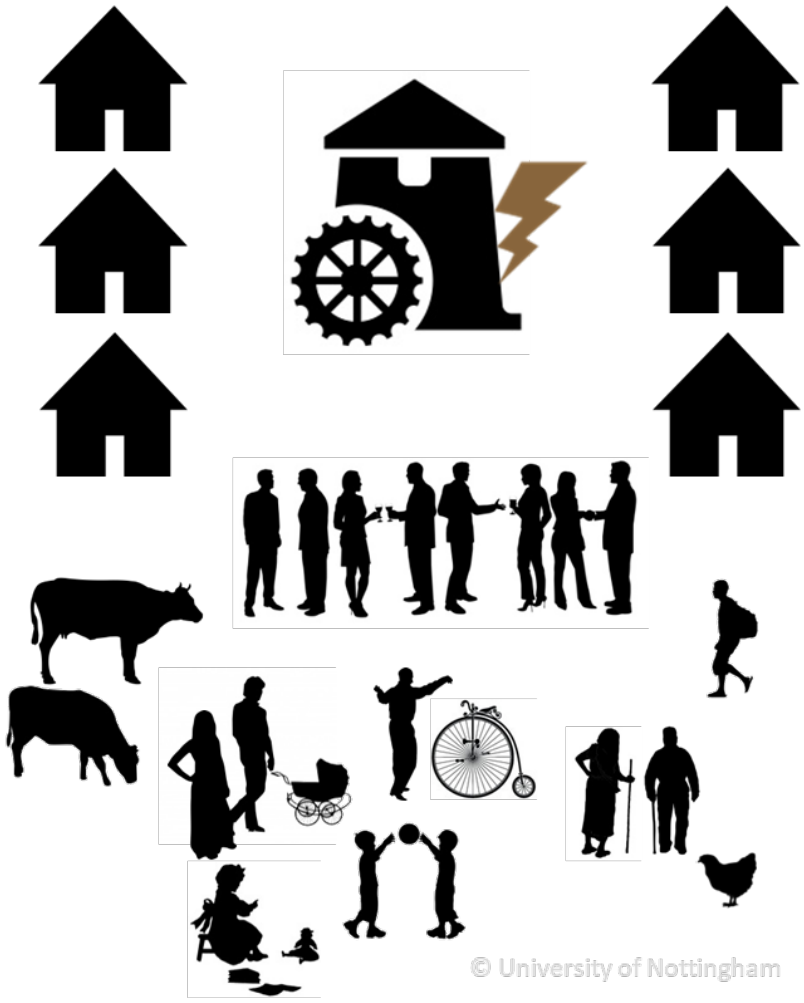
SIEMENS

Stickyworld

urbed

Slam Jam

Energy was at the Centre of Communities



Domesday Survey: in

1086

In England there were

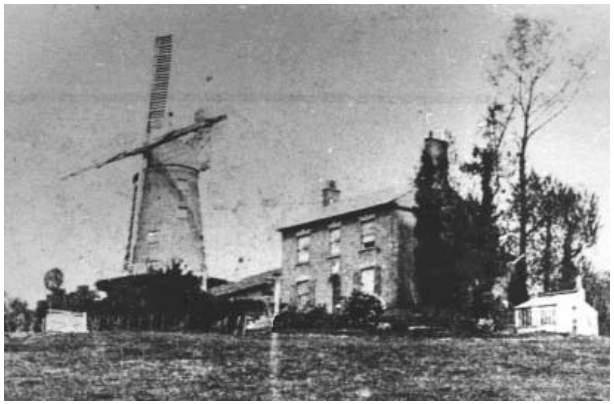
5,624

water-powered flour

MILLS

1 per 300

People were Engaged with Energy



George Green Mill in Nottingham (Green's Windmill Trust)



Work in the vegetable garden in India (source unknown)



Spinners in a cotton mill in 1911 in USA (Lewis Hine)



Caudwell's Mill, Rowsley, Derbyshire 1893 (Picture the Past)

Industrial Revolution

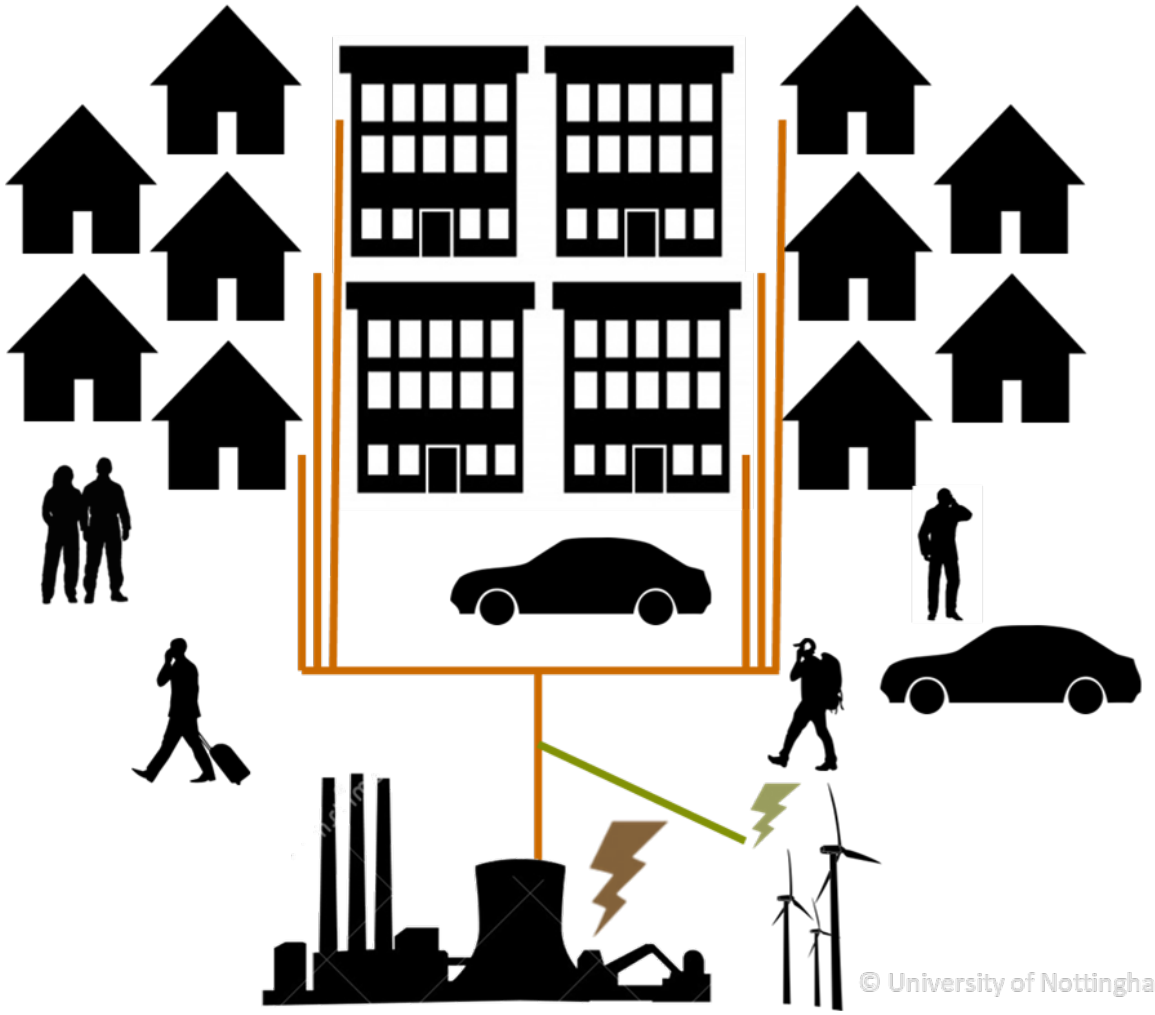


Suddenly, it is all at the flick of a switch…



People Disconnected with Energy

(and with people…)



© University of Nottingham

In 1970

UK used almost

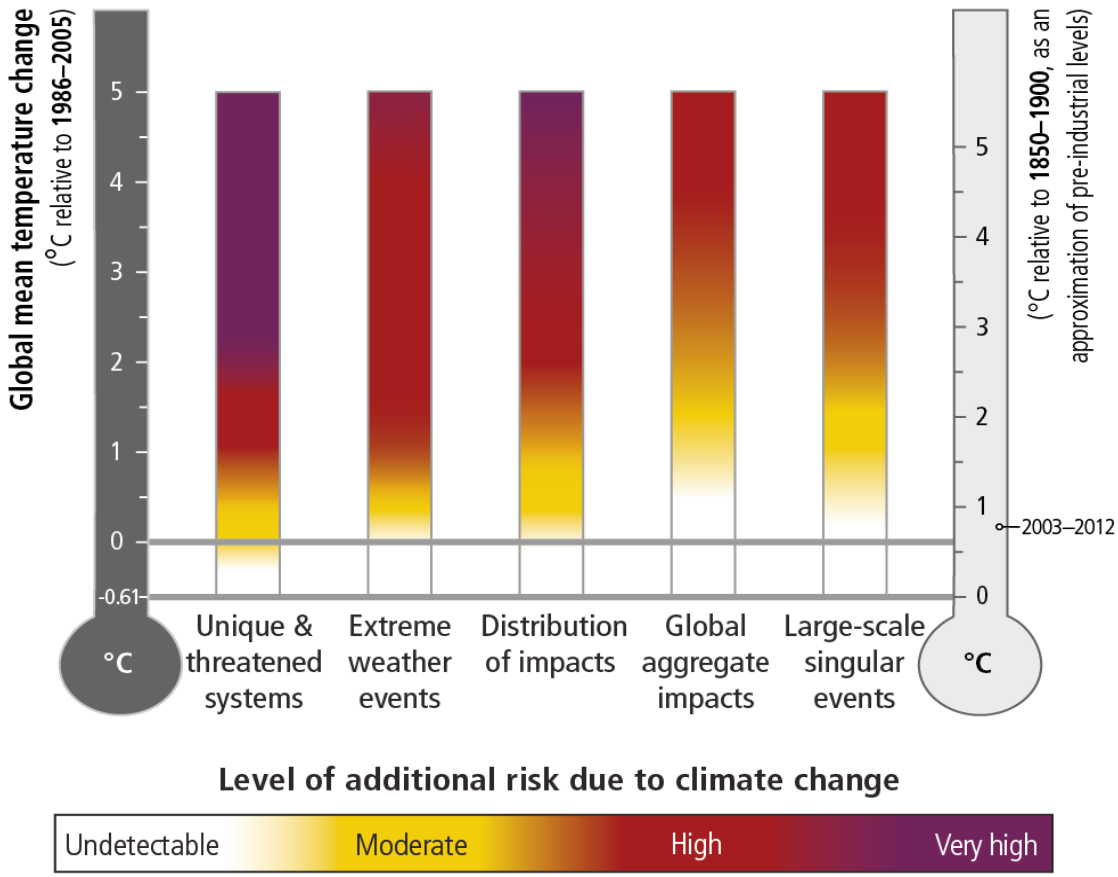
57

MILLION TONNES

of oil equivalent in

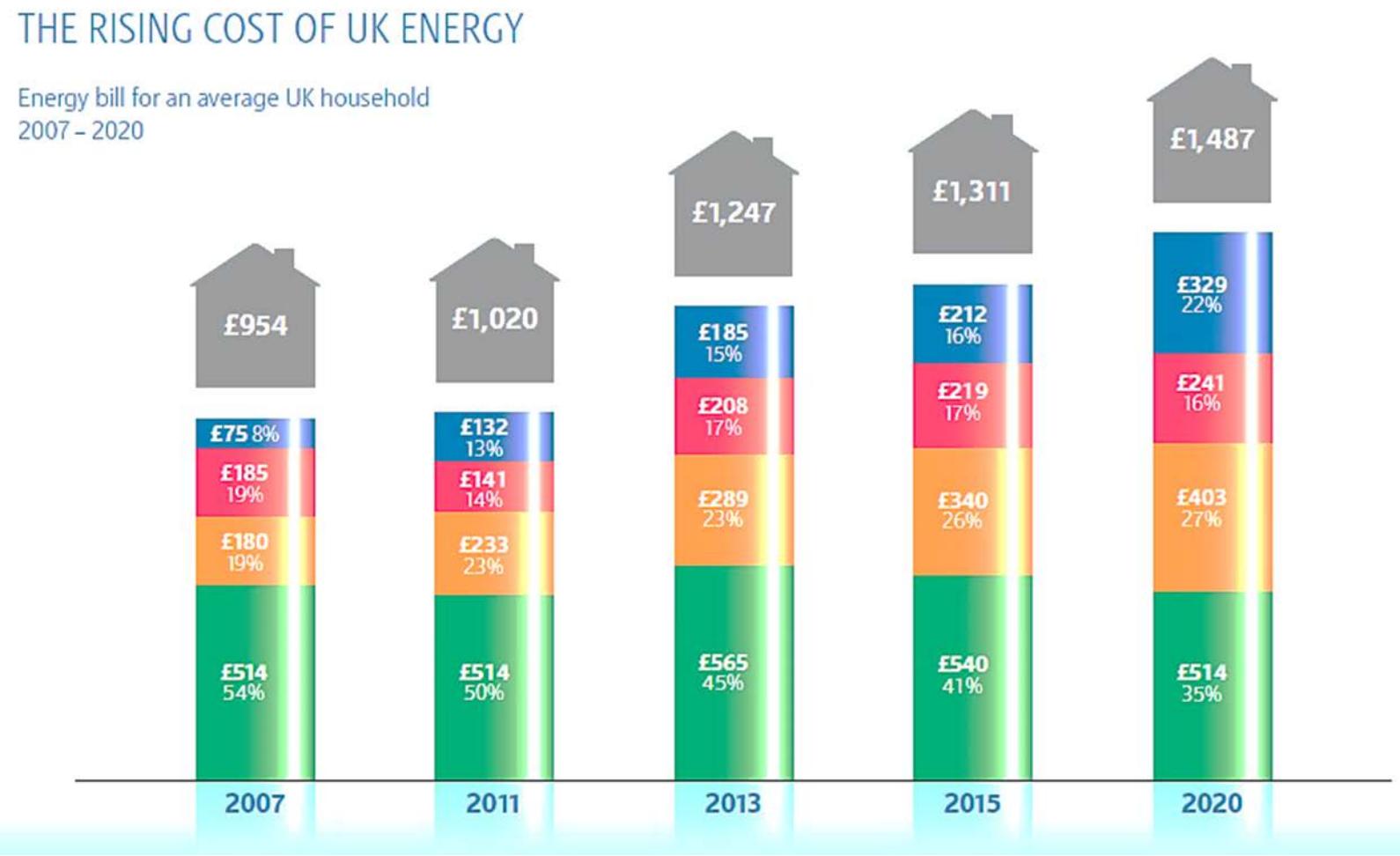
coal & fuels

But then we got hit by climate change…



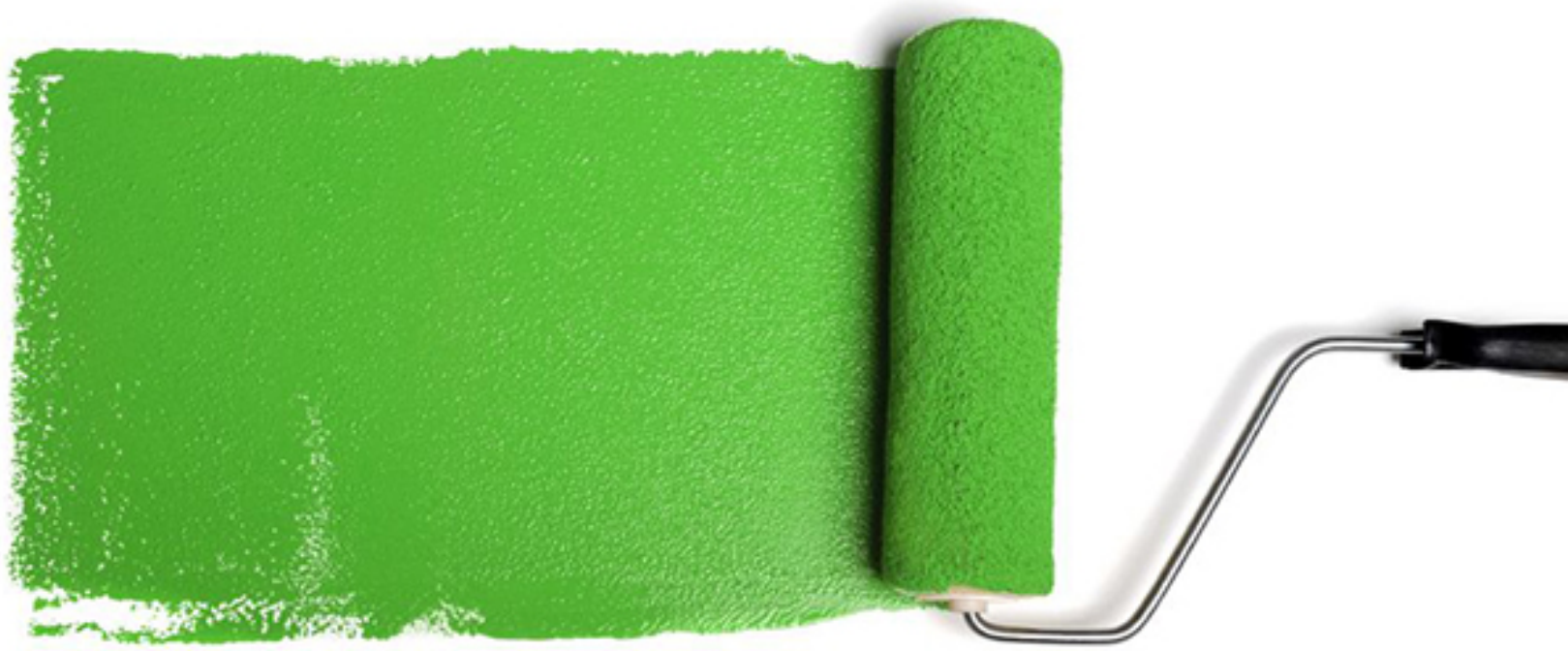
IPCC, 2014: Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland, 151 pp.

…and energy prices.



RWE npower, 2014. '*The rise cost of UK Energy'*. Swindon. Available online at http://www.npower.com/

Green Revolution



Green Revolution

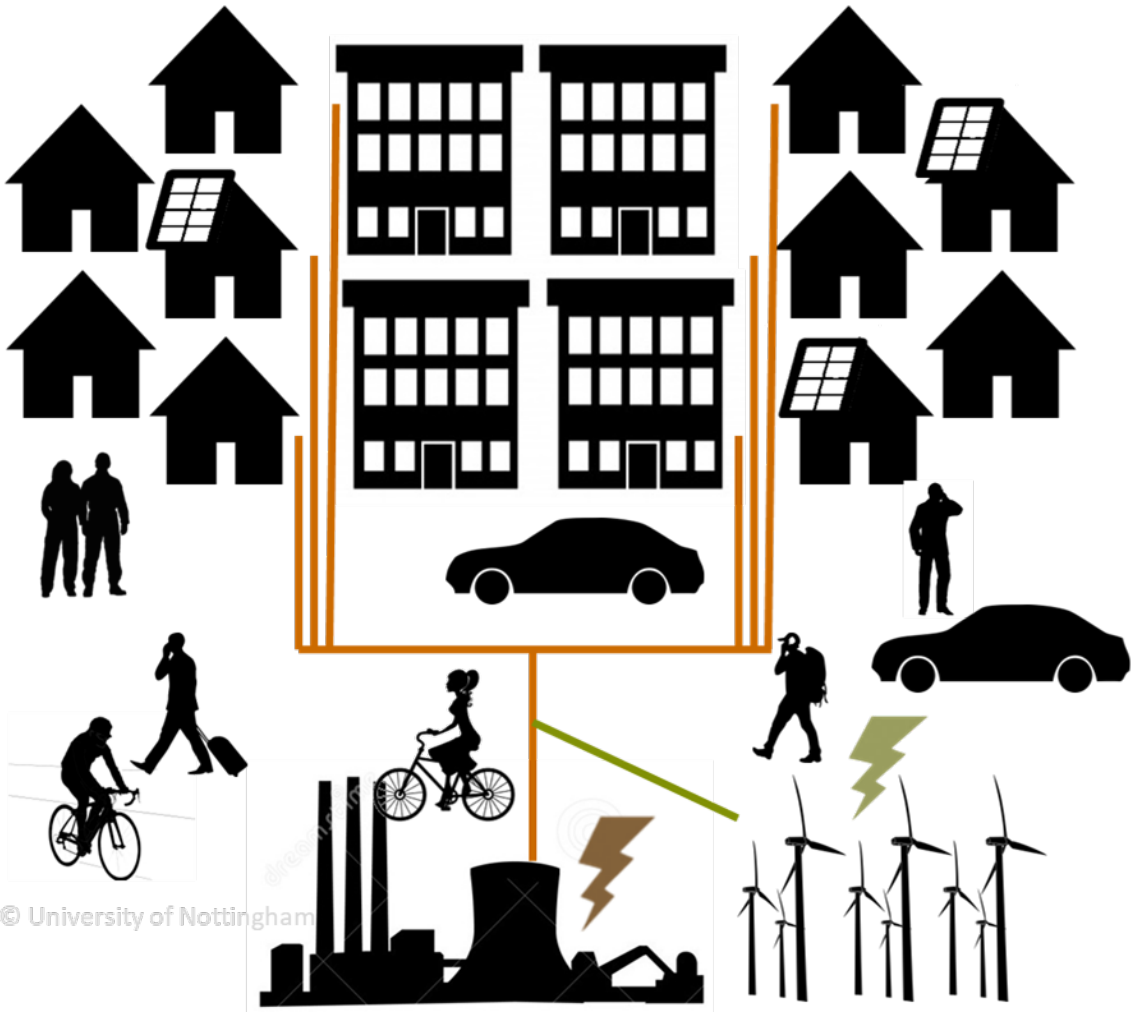
- 1992 International environmental treaty United Nations Framework Convention on Climate Change was negotiated
- 1997 Kyoto Protocol established legally binding obligations for developed countries to reduce their greenhouse gas emissions
- 2006 UK government committed that from 2016 all new homes would be 'zero carbon' and introduced the Code for Sustainable Homes
- 2008 UK is set a target to increase the contribution of renewables to UK electricity to 20% by 2020
- 2012 Incandescent light bulbs were phased out in the UK







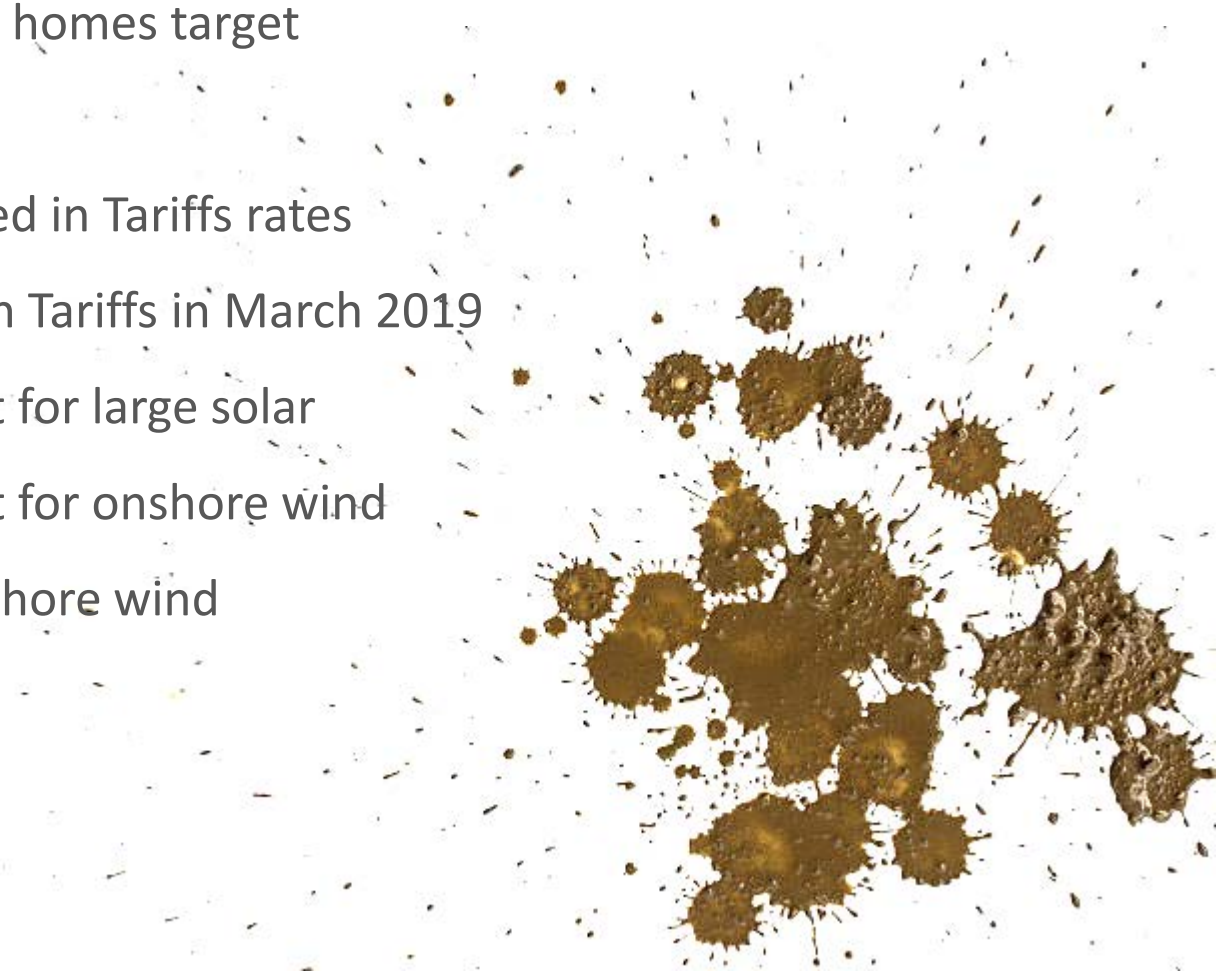
Some People Reconnect with Energy



Electricity
generation from
RENEW
ABLES
in the UK increased by
21%
between
2013 & 2014

More Recent Green Revolution

- Removal of zero carbon homes target
- End of Green Deal
- Major reductions to Feed in Tariffs rates
- Proposed end of Feed in Tariffs in March 2019
- End of financial support for large solar
- End of financial support for onshore wind
- Planning barrier for onshore wind
- Changes to tax relief

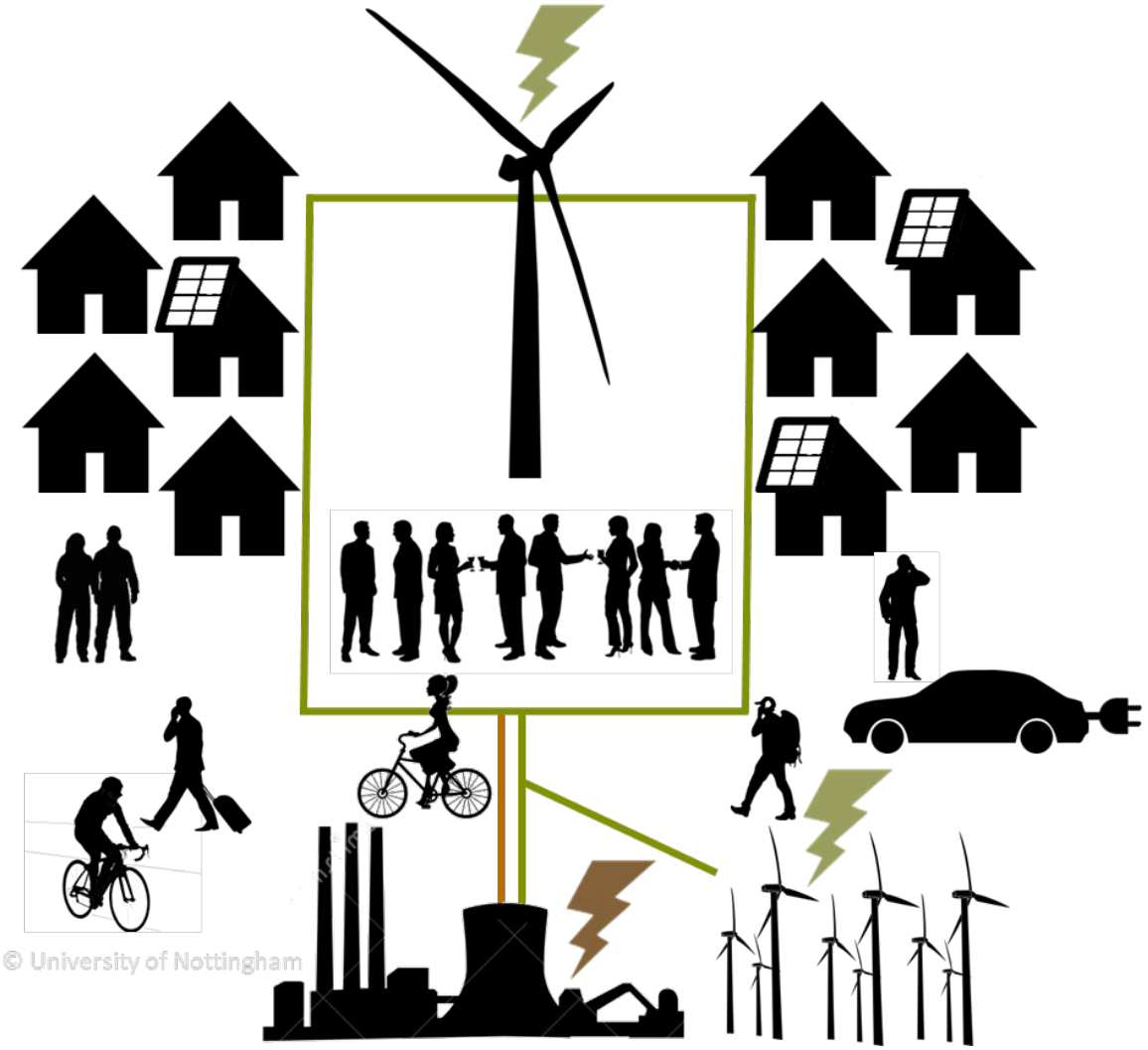


Community Energy Revolution



Energy at the hear of communities and communities at the heart of the energy system.

People Reconnect with Energy



Community-owned

ENERGY

schemes make up

40 %

of renewable energy generation

in DE

compared to

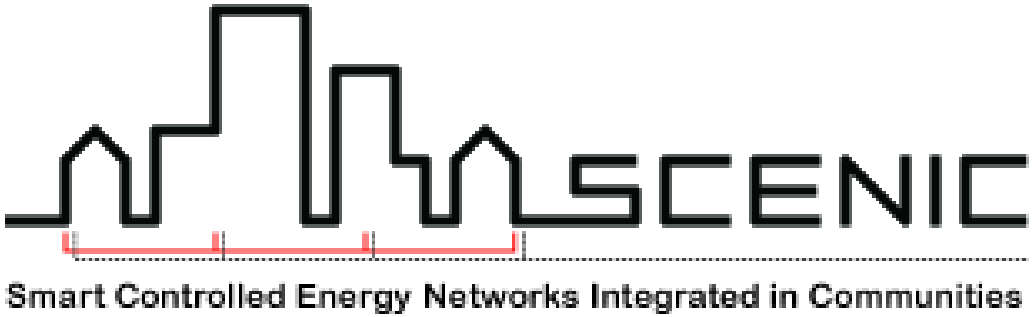
1% in UK

Consume less;
generate more;
share better.

Creative Energy Homes



Project SCENIC



SCENIC at the Creative Energy Homes is about designing, constructing and demonstrating a small scale integrated community heat and power network capable of integrating and managing all forms of sustainable energy sources

Funded by the Energy Research Accelerator and the
Energy Technology Institute

SENSIBLE Project



is about storing & sharing localised energy generation within a community increasing efficiency and reducing costs for all

www.projectsensible.eu

@SENSIBLEProject

www.facebook.com/projectsensible

Funded by the European Commission
Grant No 645963

SENSIBLE Demonstration Sites

Nottingham, UK

(at the Meadows)

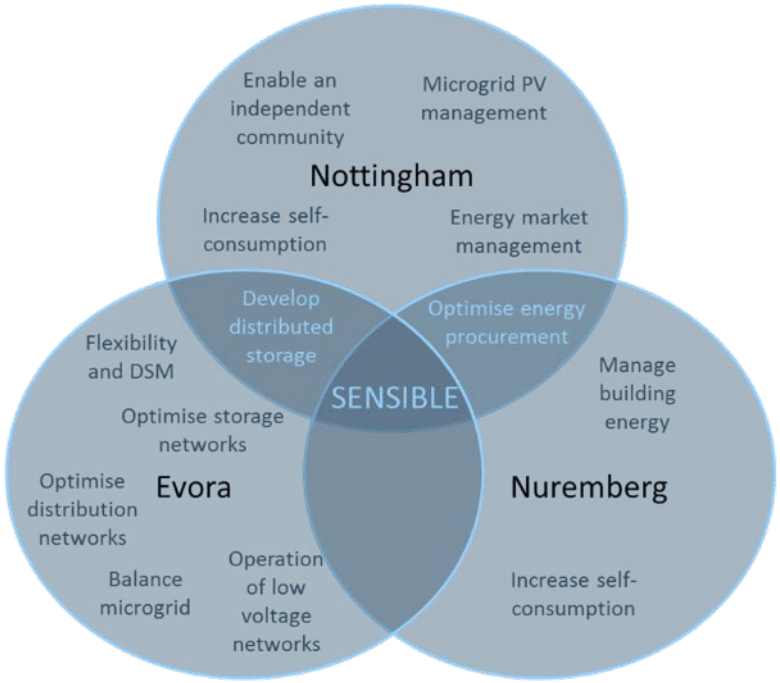


Evora, Portugal



Nuremburg, Germany





TURaS Project

TURAS

TRANSITIONING TOWARDS URBAN RESILIENCE AND SUSTAINABILITY

TURAS was about understanding and enabling strategies and processes that support community resilience and sustainability

www.turas-cities.org

@TurasCities

Funded by the European Commission Grant No 282834

TURaS' 'Twinning' concept



Trent Basin: Collaborative Planning





By applying Blueprint's Footprint Policy urban design principles and low-energy principles to the building fabric, Blueprint and a team of industry and University of Nottingham academic experts came up with a vision for this new neighbourhood back in 2013, following a couple of years of collaboration

Green Street in the Meadows, Nottingham





Bailey, David (2016) A performance evaluation of mainstream timber framed and traditional masonry housing in the UK. PhD thesis, University of Nottingham. Access from the University of Nottingham repository: http://eprints.nottingham.ac.uk/33628/1/David%20Bailey%20-%20PhD%20Thesis%20-%20eThesis.pdf

RODRIGUES, L., GARRATT, T., EBBS, N., 2012. "Is added sustainability equal to added value?" Energy Conversion and Management 63 (Special Issue SET 2011): 203-207. Elsevier.

Trent Basin homes by Tom Bennett and Denny Chan

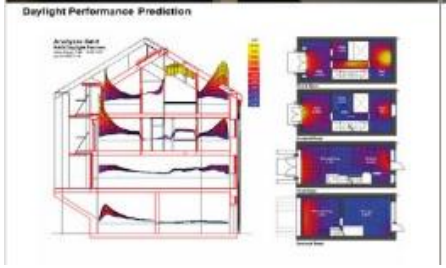














Trent Basin Microclimate Analysis by Maria Maresa Muñoz Morales

Daylight percentage on site

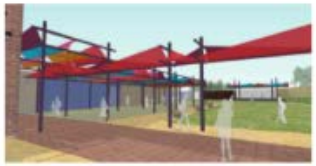
Common areas and public spaces should be located within the areas with more daylight due to Nottingham's temperatures throughout the year.

Horizontal shading devices and vegetation at these common areas or plazas can be used during summer because of the high solar's angle.

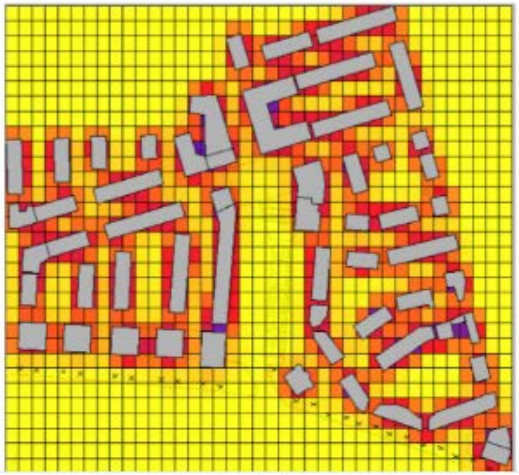
Daylight can be a determining factor for the thermal comfort of the people in the open spaces in combination with other factors such as wind speed and temperatures.



(Miramarplan, 2013)



(Architect's Newspaper, 2011)



Annual solar access on roofs

Roofs are one of the best options to have solar energy generation devices such as PV panels and solar thermal collectors. This due to its solar radiation for most of the year. These devices can be placed with the more convenient tilt for each specific tecnology and its convenient schedules.

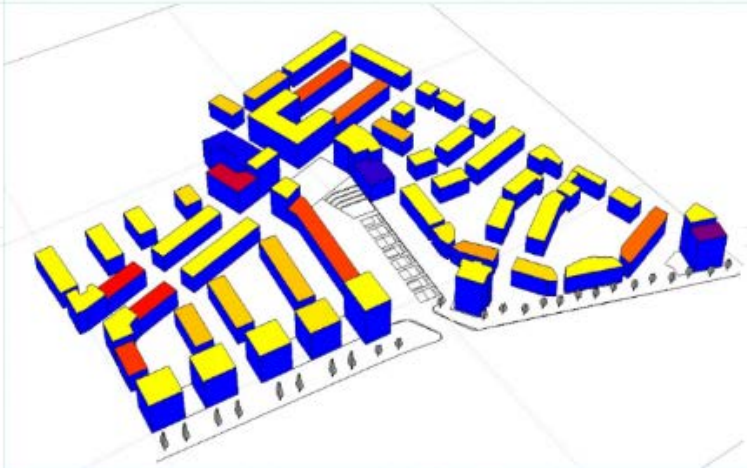
The next masterplan image contains the cumulative solar radiation including diffuse and direct. A more specific image was made in order to identify the most exposed roofs that could be the possible locations for this type of energy.



(Buildingenergyexperts, 2014)



(zmescience,2015)



Project SCENe



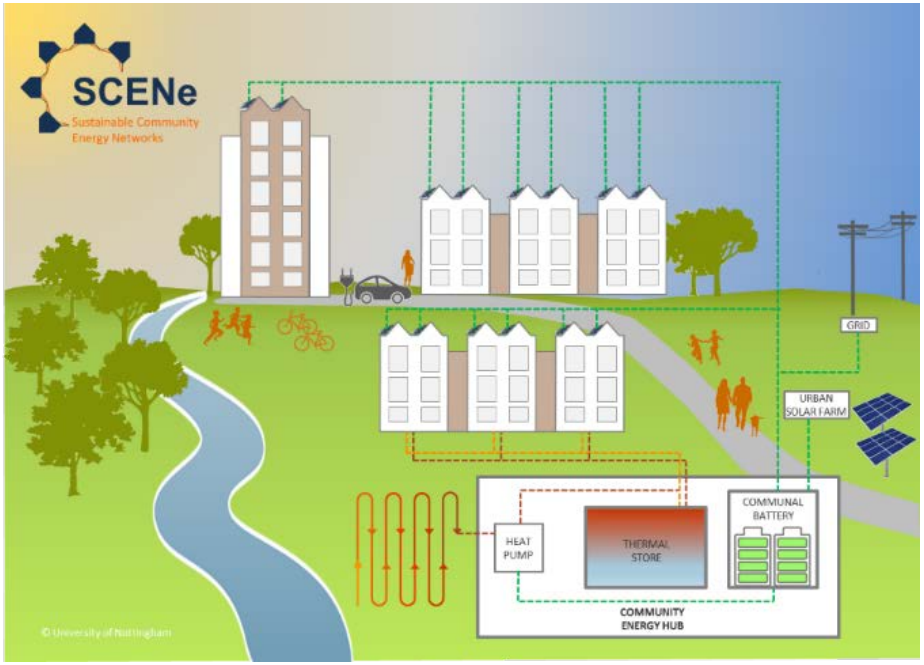
SCENe looks to accelerate the adoption of community energy schemes, which can help promote the infrastructural, social and cultural changes we need to reduce the impact of climate change and increase energy security

www.projectscene.uk
https://twitter.com/ProjectSCENe
www.facebook.com/ProjectSCENe

Funded by Innovate UK and the
Energy Research Accelerator

SCENe at the Trent Basin

- It includes:
  - an urban solar farm,
  - rooftop solar panels,
  - Europe's largest community energy battery,
  - local thermal energy production, distribution and storage,
  - a real developer and
  - real people.



- The aim is to generate and store renewable energy, and deliver grid services to the National grid at a profit, increasing efficiencies, reducing costs and decreasing the overall carbon emissions from the energy system.

SCENe's Deliverables

- A 'subsidy free' commercial model and scalable ESCo service for community energy will allow other developments to achieve similar carbon savings;
- A 'hassle free' (for the consumer) community energy/ ESCo template that makes joining it easy and desirable, encouraging more people to be part of our community energy revolution;
- Bring consumer choice to the core of the energy system, giving the consumer the right to influence the ESCo direction while not having to take responsibility for it;
- Financial benefits for the consumer and community; and
- Savings of circa 397,831 kg CO2 eq. per year in the Trent Basin development alone.

SCENe's Additional Benefits

- Increased community resilience to changes in energy provision, particularly with regard to finances and infrastructure as the community is less dependent on the grid;
- Means to reduce fuel poverty and increase energy security by reducing bills and the effect of market fluctuations;
- A future-proof community energy infrastructure with increased efficiencies and renewable energy;
- The formation of neighbourhood 'hubs/nodes/networks' to build community capital; and
- Behaviour change instigated by this bottom-up approach as people can understand their energy use in the context of the community and the UK through the visualisation of data in our community energy hub.

Project SCENe's Innovation

- SCENe is innovative because:

  a) it developed a new product - a platform that combines data analysis and machine learning to optimise performance;

  b) it combines different vectors in a single demonstrator with apartments and houses, and their users, within a commercial development; and

  c) it addresses the issue of energy efficiency as a system, including engaging the consumer via innovative means

- The key project output is a multi-vector non-subsidised business model template for developers that is hassle free and therefore much more appealing, and benefits both the developers and the end consumers
- Results will be disseminated as Business Model Templates that can be used by any developer or ESCO in the UK

SCENe proposes an ‘opt-in’ community energy scheme so you do not have to be part of it even if you live there

…which means engagement is key to the success of the project…

Community Engagement Methods

1. A Community Hub: over 50 community, project and stakeholder meetings & activities conducted there to date
2. 3D Energy Interactive Model
3. An Online Hub
4. Website
5. Social Media channels
6. In-home Smart Technology
7. Community and 1-to-1 meetings
8. Drop-in ‘clinic’ sessions
9. Focus groups, interviews, surveys (ongoing)





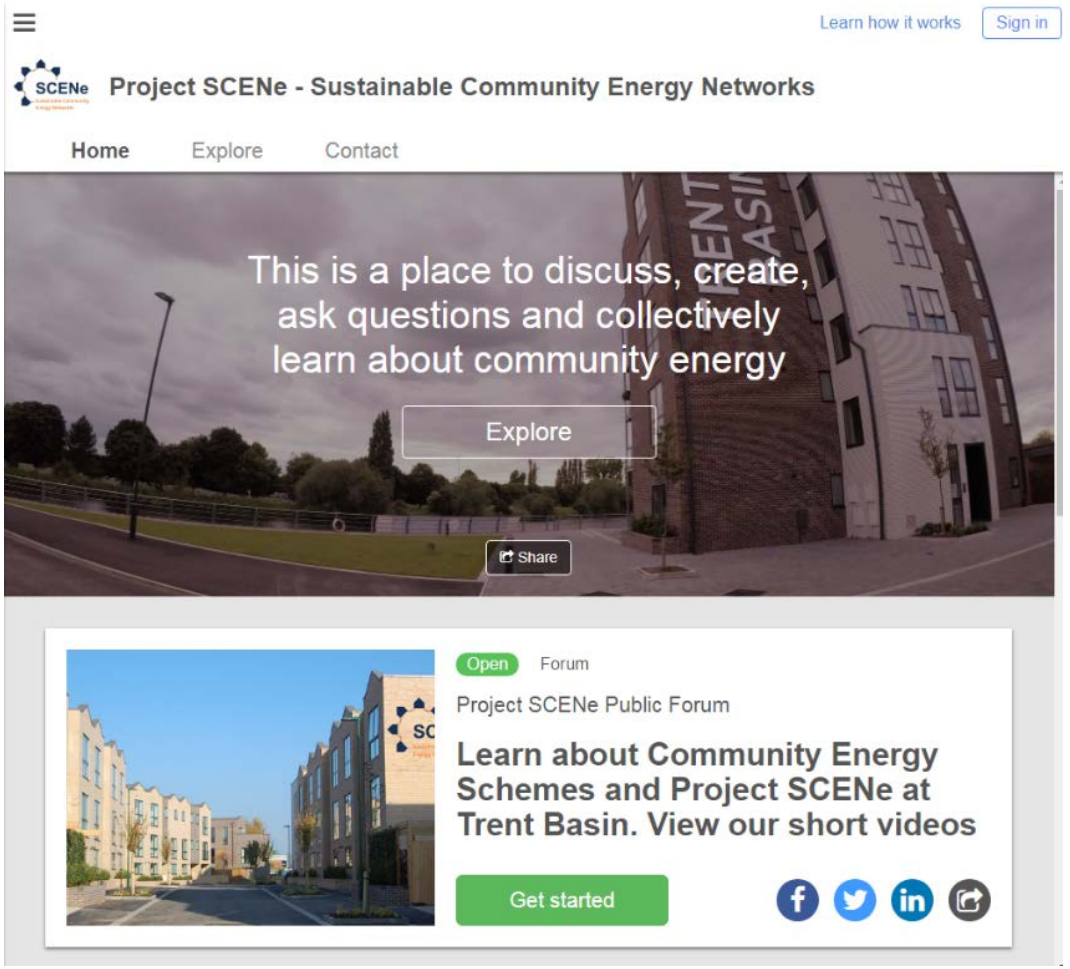
3D Energy Interactive Model

- An online display of Trent Basin, its energy assets and their states of activity
  http://uk.ies-icl.com/UoNTrentBasin



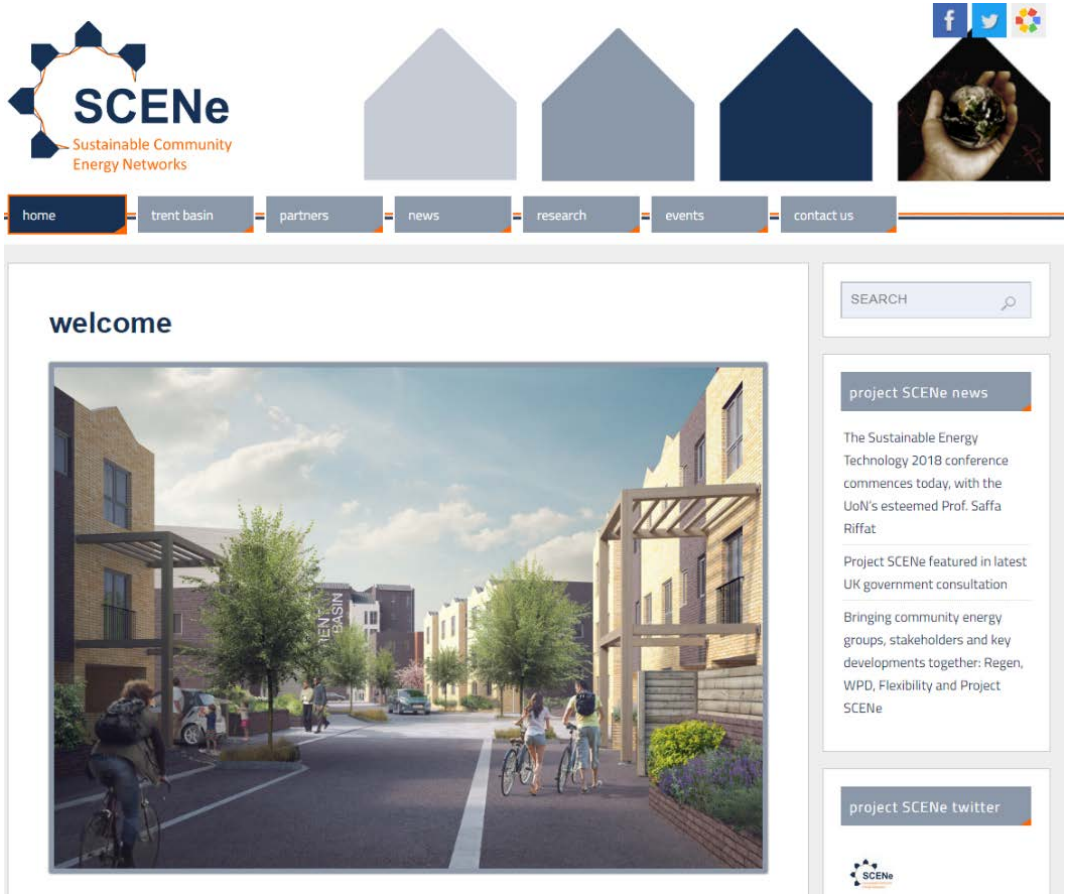
Online Hub - Stickyworld Platform

- Online platforms that enables 2 ways conversations
- Total Page Views: 10.5k
- Total Rooms: 21
- Total Slides: 101
- https://scene.stickyworld.com



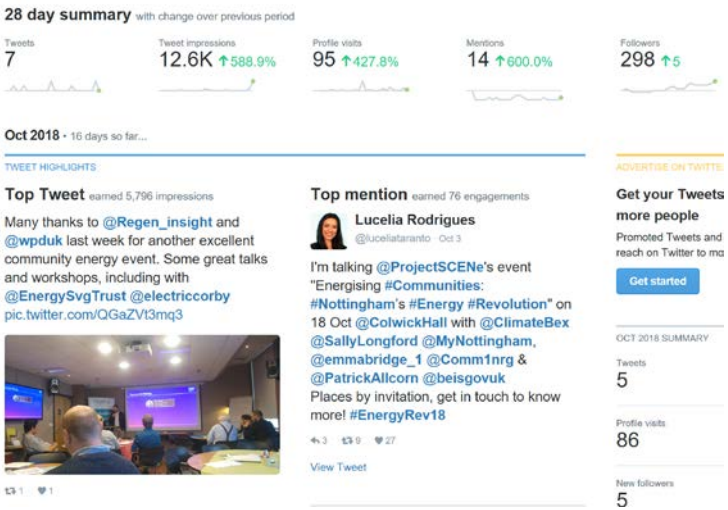
Website

- Total Page Views: 10,879
- Blogs: 20 entries and 1,599 visits
- Best overall day views: 106
- Visitors per month: 170 - 300 visitors per month in early stages (November 2016) and up to 855 visits in August 2018
- Referred by Search Engines 1,774 times, from social media 350 times and from partner's websites 115 times



Twitter

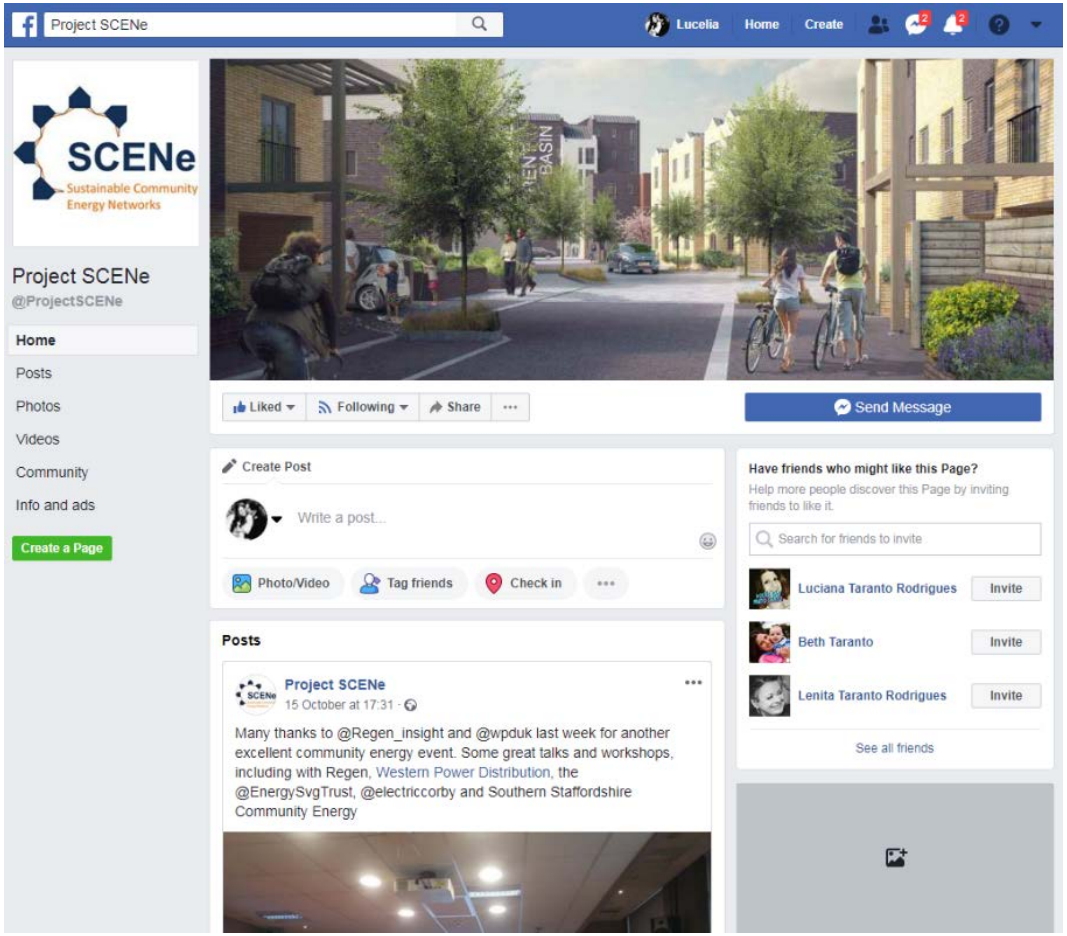
- Page Likes: 521
- Page Followers: 297
- Tweets: 548
- Tweet impressions last month: 12.6K





Facebook page

- Page Likes: 91
- Page Followers: 90
- Total Posts: 210



In-home Smart Technology

- Includes Amazon Echo Spot, Evohome Smart heating system, CO2, motion and temperature sensors, advanced heat meter & personalised smart app
- 15 households signed-up for trial to date (circa 38%, others coming shortly)
- 10 already installed
- Focus groups to access engagement and benefits will be held in early November









Project SCENe: outcomes

- Despite significant national interest to take up community energy, there are current barriers around large-scale application of these technologies, which Project SCENe is helping to overcome
- Its outcomes are relevant to all UK territories and energy stakeholders
- As evidence of this, the UK100 has featured the project in its latest report "Financing the Transition: Harnessing UK Cities' Ambition for Clean Energy (2017)"
- The UK Government's Department for Business, Energy & Industrial Strategy has also featured the project as a case study in its "The Future for Small-Scale Low-Carbon Generation – A call for evidence" (July, 2018)
- The UK Smart Cities Index, released October 2017 to recognise cities using innovative technologies to benefit the local community, has Nottingham ranked on the eight place between the UK 20 leading smart cities, and the top smart city for energy - Project SCENe was recognised as one of the key projects contributing to this achievement

Thank you!



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www.projectscene.uk



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