Barningham

Net Zero

Barningham Net Zero Energy Project

Energy Survey Results – November 2020

This Project is supported by the BEIS funded Rural Community Energy Fund which is managed by the North East Yorkshire and Humber Energy Hub and administered by Tees Valley Combined Authority

The Rural Community Energy Fund

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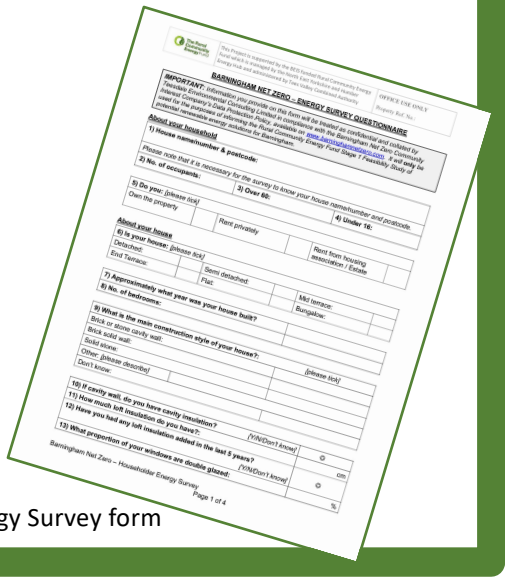
Introduction to the baseline energy survey

- Commissioned by Barningham Net Zero Community Interest Company
- Conducted by Ewan Boyd of Teesdale Environmental Consulting Ltd
- Gathered data on energy use and associated building factors
- Data used to:
  - inform the development of a community-owned renewable electricity generation scheme
  - evaluate sustainable household heating solutions
  - identify and publish energy cost saving measures for households
- These are the first steps towards achieving an aspiration of Barningham becoming a net zero carbon emissions village



BARNINGHAM NET ZERO – ENERGY SURVEY QUESTIONNAIRE

About your household

1) House name/number & postcode:

2) No. of occupants:

3) Over 60:

4) Under 16:

5) Do you: [please tick]

Own the property

Rent privately

Rent from housing association / Estate

About your house

6) Is your house: [please tick]

Detached

End Terrace

Semi detached

Flat

Mid terrace

Bungalow

7) Approximately what year was your house built?

8) No. of bedrooms:

9) What is the main construction style of your house?: [please tick]

Brick or stone cavity wall

Brick solid wall

Solid stone

Other: [please describe]

Don't know

10) If cavity wall, do you have cavity insulation?

11) How much loft insulation do you have?:

12) Have you had any loft insulation added in the last 5 years?

13) What proportion of your windows are double glazed.

[Y/N/Don't know]

cm

%

Barningham Net Zero – Householder Energy Survey

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The Energy Survey form

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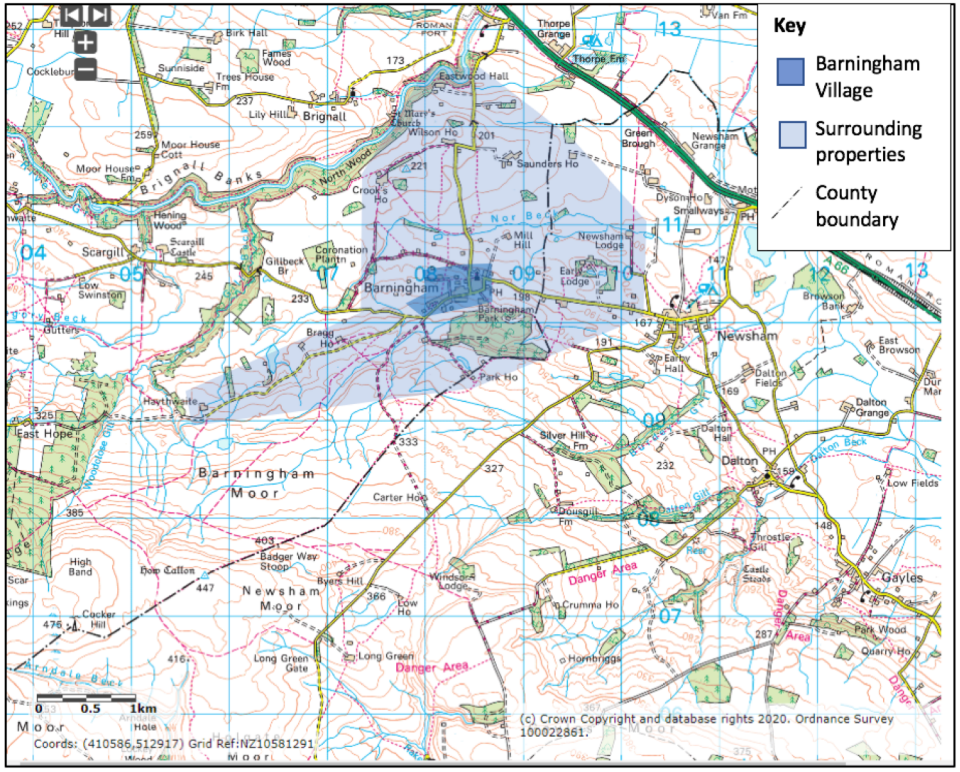
The energy survey area

- 92 surveys distributed:
  - 84 occupied residential properties
  - 3 to owners of holiday cottages
  - 2 to owners of unoccupied properties
  - 1 to St Michael and All Angels Church
  - 1 to Barningham Village Hall
  - 1 to Barningham and Holgate Estates for a number of properties and businesses
- Response rate:
  - Barningham village 70%
  - Surrounding properties 33%



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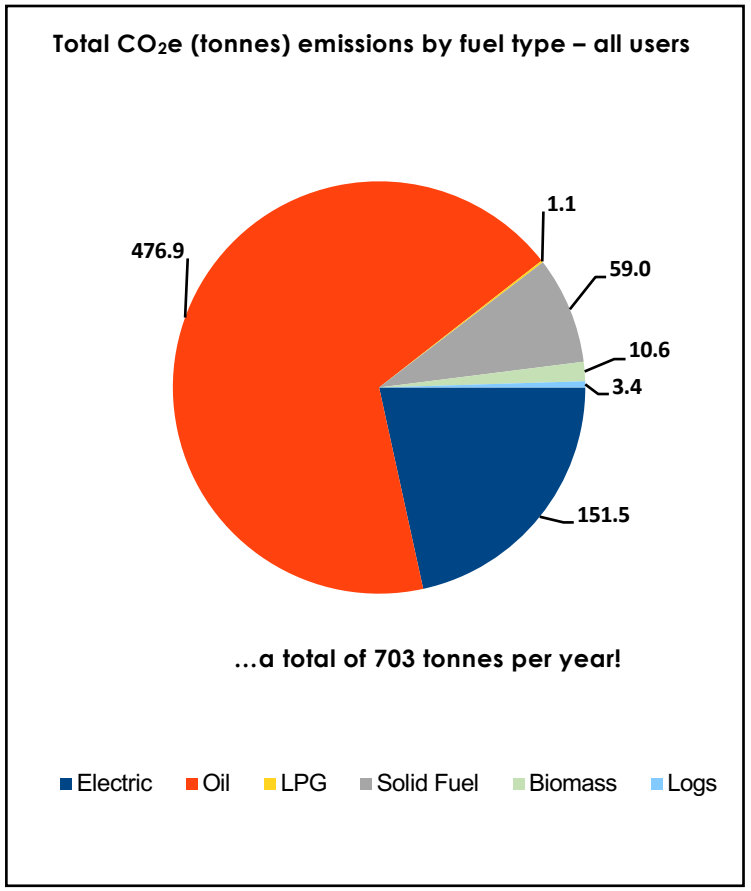
Aggregate data for survey area

- **Electricity**
  - 44% of energy costs: only 18% of energy supply: 22% of CO_2e emissions
- **Oil**
  - The main heating fuel
  - Only 35% of costs: 53% of energy demand: by far the largest source of CO_2e emissions at 68%
- **Biomass and logs**
  - 18% of energy costs: 24% of total energy consumption: only 2% of local CO_2 emissions
- **Solid fuel (e.g. coal)**
  - Limited use
  - 2.1% of costs: 4.7% of consumption by kWh: 8.4% of greenhouse gas emissions
  - House coal to be phased out in the near future

	Electricity	Oil	LPG	Solid fuel	Biomass	Logs	Total
Cost	£107,600	£85,500	£700	£5,200	£28,000	£16,700	£243,700
	44.2%	35.1%	0.3%	2.1%	11.5%	6.9%	
kWh	658,700	1,930,600	5,100	171,000	677,000	217,700	3,660,100
	18.0%	52.7%	0.1%	4.7%	18.5%	5.9%	
CO_2e (tonnes)	151.5	476.9	1.1	59.0	10.6	3.4	702.5
	21.6%	67.9%	0.2%	8.4%	1.5%	0.5%	

Estimated annual total energy costs, consumption and CO_2e emissions - full survey area



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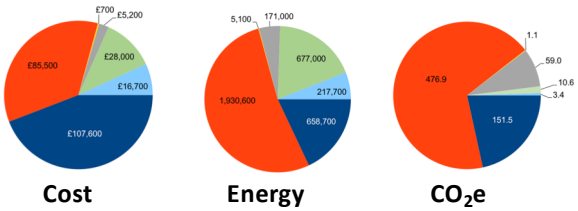
Oil

- The main heating fuel (**red**):
  - Cost 35%
  - Energy consumption 53%
  - CO_2e emissions 68% - largest source



- Further options to be considered in the study:
  - Additional district heating schemes, e.g. extension of ground source heating at a new build site to existing homes
  - Switching to non-fossil fuels, e.g. synthetic oil
  - Replacement of oil-fired systems with electrical systems (e.g. heat pumps) or wood-product fired systems
- Short term energy usage and emissions reduction could be made by:
  - Improved home energy management
  - Installation of energy efficiency measures

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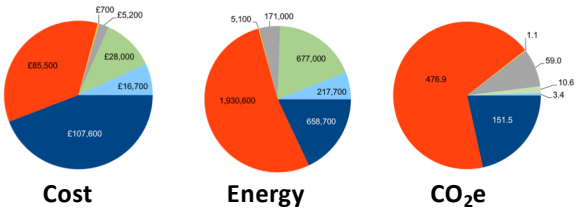
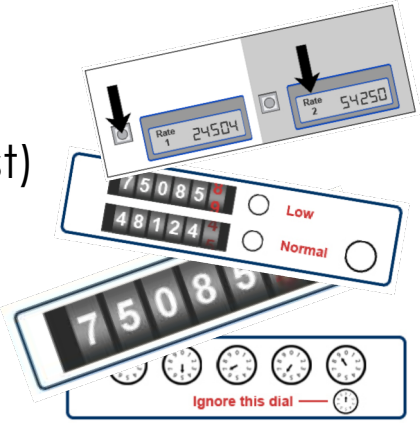
Electricity – currently

- Current usage(**blue**):
  - Cost 44% - highest cost
  - Energy consumption 18%
  - CO_2e emissions 22%



- One option for meeting *current* electricity demand would be installation of 1.5 acres of solar panels and two 25 metre turbines
- Short term methods to reduce costs and/or emissions:
  - Switch to a lower cost tariff and/or supplier
  - Switch to a 100% renewable energy supplier (may be higher cost)
  - Adopt improved home energy management measures
  - Installation of energy efficiency measures



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Electricity – meeting future demand

- Consider installation of a renewable electricity generation scheme for future increases in electricity demand
  - Proposed housing developments at Hill Top and Glebe Farms
  - Electrical heating solutions
  - Electric vehicles

Electricity Demand	kWh per year	% increase over current
Current Barningham & vicinity usage	658,700	
New houses (1,375m^2)	77,300	11.7%
Electric heating solutions in existing houses (2)	8,540	1.3%
Electric vehicles (23)	63,250	9.6%
Total:	807,790	22.6%

Estimation of potential future electricity demand (by 2028)

- A larger capacity may be desirable to maximise the potential income stream arising from a community-owned electricity generation scheme
- This approach is in line with many other community energy projects
- Activities included in the study will address:
  - Acceptability
  - Grid connection
  - Planning
  - Commercial viability

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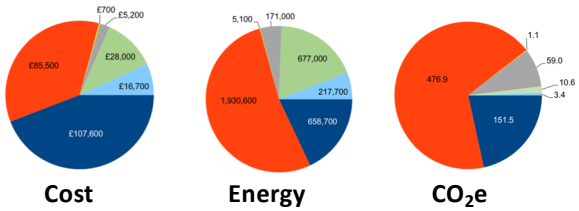
Solid fuel (e.g. coal)

- Local use is limited (**grey**):
  - Cost 2.1%
  - Energy consumption 4.7%
  - CO_2e emissions 8.4%



- Bagged house coal will be phased out by February 2021
- Sale of loose coal direct to customers will end by February 2023
- Users of coal will need to switch to cleaner alternatives such as dry wood and manufactured solid fuels

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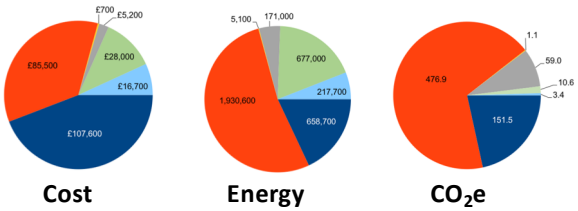
Biomass & logs

- High level of usage of wood products (**green**):
  - Cost 18%
  - Energy consumption 24%
  - CO_2e emissions 2% - lowest emissions



- Increasing usage of biomass and logs to replace other fuels would improve sustainability and reduce carbon emissions
- Economics of new biomass district heating schemes currently not attractive
- New wood-burning stoves (to comply with DEFRA Eco-design regulations by 2022) have reduced emissions, improved efficiency and sustainability
- Short term reductions in fuel usage and emissions could be realised by installation of energy efficiency measures

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Key findings from the survey data

- Electricity and energy costs could be reduced by:
  - Changing tariff and/or supplier
  - Fitting additional insulation, double glazing, modern boilers, etc.
- Biomass (woodchip and logs):
  - 24% of our local energy
  - only 2% of our greenhouse gas emissions
- Heating oil:
  - 68% greenhouse gas emissions
  - just 53% of energy demand
- Electricity:
  - 18% of energy demand
  - 22% of emissions but a huge 44% of energy costs

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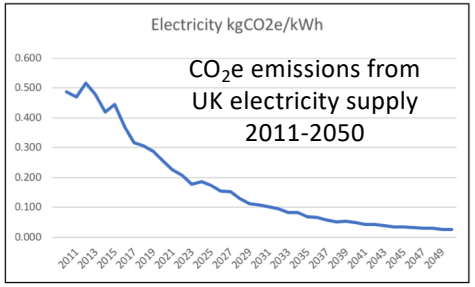
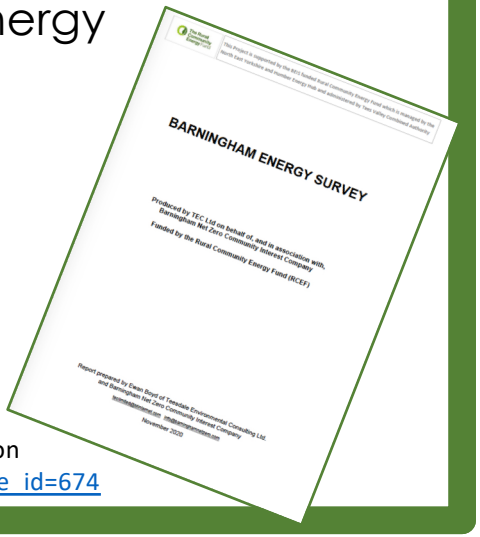
Conclusions so far on a possible future

- Switch from fossil fuels to biomass and electricity would reduce emissions closer to our target of net zero
- A community-owned renewable electricity generation scheme could both reduce costs and climate-changing emissions
- One option for meeting *current* electricity demand would be installation of 1.5 acres of solar panels and two 25 metre turbines
- A larger scheme could meet *future* demand (EVs and heating technologies) and provide income from the sale of surplus generation for local energy efficiency improvements
- A local project would contribute to the UK decarbonisation plan





The Energy Survey Report available on
www.barninghamnetzero.com/?page_id=674

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Next steps

- Target RCEF Stage 1 Feasibility Study completion April 2021
- Currently working on:
  - Grid connections
  - Land owners' engagement
  - Available electricity generation technologies and cost
  - Planning engagement
  - Community engagement
- Options for local renewable electricity generation will be put forward for community consideration in January
- Energy Factsheets will soon start to be published
- Investigation of sustainable heating solutions
- Financial model for renewable electricity generation scheme
- RCEF Stage 2 application to support:
  - Feasible scheme detailed design
  - Planning application
  - Funding proposal