

National Energy Efficiency Data-Framework (NEED) user event

September 2014

Department of Energy & Climate Change

Introduction

Duncan Millard, Head of Statistics, DECC



Agenda

- 11:15 Welcome and introduction Duncan Millard, DECC Head of Statistics
- 11:30 Domestic NEED overview
- 12:00 User perspectives on anonymised dataset
- 12:15 Table Discussion: Anonymised dataset
- 12:45 Feedback from table discussions
- 12:55 Lunch
- 13:35 Non-domestic NEED overview
- 14:15 Table Discussion: Priorities for the future of NEED
- 14:40 Feedback from table discussion
- 14:50 Summary and Close



Domestic NEED overview

Mary Gregory and Claire Pini









What is domestic NEED



- Framework for combining data from existing sources
- Links data at property level (using UPRN)
- Provides insights into how energy is used and the impact of installing energy efficiency measures



Developments

Publication of anonymised versions of NEED

→ Public use file and end user licence file (PUF and EUL)

• Expanded domestic consumption analysis variables

 \rightarrow IMD, fuel poverty, rural urban

• Assessment by the UK Statistics Authority

 \rightarrow can be designated National Statistics subject to small number of requirements

• Preliminary analysis of EPC data

→energy efficiency band, environmental impact band

· Initial analysis for Scotland

→consumption by property attributes, household characteristics

→impact of measures – cavity wall insulation and loft insulation



Developments

• Worked/working with other organisations to gain access to new and updated sources of data

→EPC data

→boiler data

→FENSA

Converted to AddressBase UPRN

→address match internally

• Solar PV installations

 \rightarrow linked to NEED to enable analysis

• Non-domestic publication

→first analysis published in May



Results – domestic consumption

Consumption, 2012, by rural urban classification



- Rural properties typically consume the most gas and electricity
- Driven by property size
- Off gas properties in rural areas



Results – domestic consumption

Gas consumption, 2012, by floor area and index of multiple deprivation



- For each floor area band, consumption higher for less deprived properties
- Deprived areas are more likely to be social housing more energy efficient and possibly more likely to be underheating





- Typical consumption higher in Scotland than England and Wales
- Unlike England and Wales, breakdowns based on modelled data by Experian
- Detached properties consume the most (consistent with E&W), followed by Bungalows (not consistent with E&W)





Making more data more accessible – Department of Energy & Climate Change produced a number of tools



23





A Electricity 🗔 Log in Contac **Compare My Energy** Home Compare my energy About Energy saving tips Popular questions Results and About your property and energy use recommendations Save results About your property Your home Regional average House number/name Your energy use: 4199 kWh per year Postcode Find address > About my result Your energy use is above average for similar properties within your region, which on our scale equates to an Property type Please choose amber rating. It would be worth investigating whether you can do something to lower your energy bills. Year built Please choose Ways to save Owner O Renter Because you're an above average user, you're spending £110 more than people in your local area. Following the Ownership tips below could help you make savings on your energy bills. Loft insulation Which of the following do Cavity wall insulation Solid wall insulation Boiler installed after Solar panels Double glazing you have? 2000 Draught proofing Ideas to lower your energy use Number of occupants Please choose 1. Use energy saving light bulbs Number of bedrooms Please choose • Replacing just one old light bulb with an energy saving recommended one can reduce lighting costs by up to £78 over the lifetime of the bulb. Plus they last up to 12 times longer than the ordinary light bulbs. Your energy usage 2. Don't leave appliances on standby Don't leave appliances on standby and remember not to leave appliances on charge unnecessarily. It all adds up and **Electricity usage** ○ £'s OR ○ kWh Select period wastes money. ○ £'s OR ○ kWh Select period Gas usage Optional Compare > Save the results of this comparison, so you can see the difference when you make energy efficiency improvements in your home.

http://www.comparemyenergy.org.uk/

Change data Save Results







Energy Performance Certificates

- First introduced in England and Wales in 2007
- Needed whenever a property is built, sold or rented
- Also now required prior to a measure being installed through the Green Deal, RHI or FITs

An EPC contains:

- Information about a property's:
 - energy use Ο
 - typical energy costs
- Recommendations about how to • reduce energy and save money





Results – EPC data

Electricity consumption, by energy efficiency band



- Typical consumption has changed over time for properties in different energy efficiency bands
- Properties in band G had greatest reduction – 32 per cent reduction over period
- 18 per cent reduction for group with second biggest reduction (band F)
- 12 per cent reduction for all properties



Future plans

• Further work with external organisations e.g. academics, industry, GDS and open data community

 \rightarrow produce information which helps support energy efficiency in households

• Interaction of household policies

→information on households benefitting from different policies

• Feed-in Tariffs (FITs)

 \rightarrow types of properties, impact on consumption

• EPC data

→build on preliminary analysis and undertake analysis for Scotland

Scotland

 \rightarrow gain access to assessor data for more robust analysis

Anonymised dataset

 \rightarrow review current release with view to publishing update in spring 2015

Department of Energy & Climate Change

Questions



NEED anonymised dataset



Two datasets published by DECC:

- Public Use File (PUF): Sample of 49,815 records selected to be representative of the housing stock (based on Region, property age, property type and floor area band). The dataset is available to download from NEED pages of the Government website and from <u>data.gov.uk</u>.
- End User Licence File (EUL): A sample of 4 million records (4,086,448). This dataset is available from the UK Data Archive, via an end user licence.

Department of Energy & Climate Change

Anonymised NEED dataset uses

Feedback from public consultation suggested many possible uses of the datasets, including:

- Modelling energy demand and understanding trends in demand for certain household characteristics;
- Understanding the savings from installing energy efficiency measures;
- Informing probabilistic bottom up stock models;
- Understanding the relationship between theoretical consumption/EPC bands and actual energy use;
- Highlighting behavioural trends such as preference in taking efficiency in savings or comfort;
- Potential to use the data to improve the accuracy of industry settlement in future;
- Use in future 'hack' events (similar to the Open Data Challenge);
- Impact of off gas and E7 efficiency;
- Support prioritisation of action against housing energy performance; and
- To improve the knowledge of council staff in dealing with residents enquiries.



Ben Anderson, Southampton University



"Promoting the better use and supply of energy to counter climate change"

NEED User Event

Luke Smith National Energy Foundation



Table discussion – anonymised dataset

- Have you used the dataset and if so, how? What value has it provided? Have you had any new insights from the analysis?
- Any feedback on dataset content, format or access?
- What would be the most valuable change for any future release?
- Is the approach to release correct, or value tighter restrictions on access in order to access more data/larger less detailed dataset publically available?
- If we made a larger PUF what would be the most important variables and which variables from the current dataset could be dropped?
- What additional use could be made of the dataset if changes were made?

Department of Energy & Climate Change

Feedback



National Energy Efficiency Data-Framework (NEED) user event

September 2014



Non-domestic NEED update

Stephen Oxley Energy Efficiency Deployment Office





1. Introduction

- 2. Overview of the May 2014 report
 - Quality assurance
 - Emerging results
- 3. New improvements
- 4. Future plans



Non-domestic NEED Framework



FRAMEWORK

Coverage: England & Wales

Consumption: Metered electricity & gas only

Non domestic ratings spine

Matched at property level



Purpose of ND NEED

What it is?

- Use readily available administrative data for analysis of building energy uses.
- Enable large scale and detailed analysis of energy use and efficiency within non-domestic buildings.
- Potential evaluation dataset for DECC's non-domestic programmes

What it's not?

• Detailed premises energy use dataset. This is being developed by DECC as a separate but linked project through the Building Energy Efficiency Survey.



May 2014 report

- 1. Introduction
- 2. Overview of the May 2014 report
 - Quality assurance
 - Emerging results
- 3. New improvements
- 4. Future plans



https://www.gov.uk/government/statistics/the-non-domesticnational-energy-efficiency-data-framework-nd-need Department of Energy & Climate Change

Quality of NEED – match rates

Proportion of non-domestic electricity consumption and meters recorded in sub-national consumption statistics captured in ND-NEED



Successful matches to electricity consumption by type and size of premises





Other QA findings & issues

- VOA floor area is only available for a limited number of building types. Offices, shops, warehouses and factories all well represented. Public sector (e.g. schools, hospitals) very low and some areas of hospitality (e.g. hotels, pubs)
- **Consistent matching:** NEED is built around address matching and that doesn't guarantee the address in each dataset covers the same space / activities. Comparison between VOA and DEC floor area shows around 20% of matches have a very different floor area.
- **Classification of buildings:** Records can only be matched with confidence at building level (not sub-premises level). NEED classifies these buildings based on the dominant sub-premises type (largest floor area).
- **Incomplete coverage:** cannot identify where some meters but not all have been matched. This needs further analysis including looking at outliers.



Results - Distributions

Due to a number of high consuming buildings, there is skew present in both the electricity and gas statistics. The mean for both gas and electricity are similar to the 90th percentile.





There has been an overall reduction in both electricity and gas in the last six years. This reduction was larger for gas which has decreased by 24 per cent from 2006 to 2011 compared to electricity which fell 10 per cent over the same time period.



Figure 6: Median Electricity and Gas intensity in the non-domestic sector, 2006-2011, England and Wales.

Department of Energy & Climate Change

Results – Building Type

ND-NEED provides the opportunity to explore building types of interest to investigate how these are changing. The report also examines building type interactions against floor area, employee numbers and organisation size

Figure 8: Median electricity intensity for nondomestic buildings by building type, 2006-2011, England and Wales.









Results – Floor area

For floor area an effect is observed where the largest and smallest floor areas have the highest intensity.

Intensity for the largest floor types for all building types is heavily influenced by factories, offices and shops which account for over 50% of this population.

Figure 11: Median electricity intensity by building type and by floor area space, England and Wales, 2011



Figure 12: Median gas intensity by building type and by floor area space, England and Wales, 2011



■ 0-49 ■ 50-99 ■ 100-249 ■ 250-999 ■ 1,000-4,999 ■ 5,000+



The Weighting methodology grosses up to sub-premises total (from the VOA) and the consumption data in two separate steps.





Weighting – Sector Breakdown

The proposed weighting methodology covers 91-95% of sub-national consumption. The poorest coverage is of half-hourly meters were only 84% of consumption is covered. In the sector breakdown, the biggest change in % of total is for shops which are well covered by NEED and generally low consuming.

Table x (not in report): Proportion of Total Consumption by Building Type, Weighted and Unweighted.





Current projects supported

- 1. Introduction
- 2. Overview of the May 2014 report
 - Quality assurance
 - Emerging results
- 3. Current projects supported
- 4. New improvements & future plans



Current projects supported

Building Energy Efficiency Survey (BEES) Project to improve and update evidence of how energy is used, and an assessment of the abatement opportunities for all non-domestic premises across England and Wales. https://www.gov.uk/government/collections/non-domestic-buildings-energy-useproject

- •Understanding the population of non-dom buildings.
- •Validation of total electricity & gas use
- •Potential for metered consumption data to apply trend data to the snapshot modelled use.

CRC Energy Efficiency Scheme evaluation

• Econometric analysis of CRC participants energy use relative to a control group using metered electricity and gas consumption.





- 1. Introduction
- 2. Overview of the May 2014 report
 - Quality assurance
 - Emerging results
- 3. Current projects supported
- 4. New improvements & future plans



Improvements done / planned

- DECC has developed new in-house address matching to match raw data to the UPRN spine.
 - Typically improved match rate from a third to a half with improvement reasonably consistent across building types.
 - Reduces the exposure to bias
 - Implementing the electricity weighting method... still developing for gas.
- Addition of 2012 consumption data.
- Detailed analysis of outliers
 - Considering how to screen for these and removing influential / erroneous data-points to enable analysis of the distribution and mean not just medians.



Statistical outputs expected

Summary statistics (all weighted) – Analysis for well represented sectors (e.g. offices, shops, factories and warehouses)

- Electricity and gas consumption trends by building type and sector.
- Coverage of floor areas (estimated 2012) by building type and sectorexplain any differences to VOA published data.
- Energy intensity of buildings (per m2) by type and sector.
- Analysis of energy use and intensity by business size.

Hypothesis testing

• Statistical analysis of different energy uses for SMEs and large businesses.

Department of Energy & Climate Change

Questions



Priorities for future of NEED

Future plans



- Three top priorities?
- One "quick win"?

23

Department of Energy & Climate Change Department of Energy & Climate Change

Feedback



Summary and Close

Department of Energy & Climate Change

Thank you!