Environmental *Change* Institute

eci | University of Oxford

METER Reading

Energy-use.org

Project update #3

Highlights

Meet our Data Scientist

- Marina Diakonova brings a background in complexity science to the team
- See the visualisation and analytical tools she developed already (see p.2,3)

Data, data, data

- View profiles at energy-use.org/gallery
- Now the analysis can begin
- What aspects are most relevant?
- Have your say at the next workshop

The App goes live

- From the start of this year we no longer use paper diaries
- Feedback is positive. Activities reported per user up by 30%
- Processing now faster and more accurate

Spring 2017

18 months in, data is beginning to accumulate. Time to put it to good use. In this issue you will find new ways to view it. Our next workshop will focus on analysing and sharing it.

16 520 938

El. readings

5 626

Coded activities

2nd Expert Workshop

Using Meter Data

In June our 2nd workshop will discuss how to share Meter data and put it to good use. To attend, please contact

meter@energy.ox.ac.uk

Contents

Cutting through complexity

Marina joined the Meter Project in November 2016 and brings a wealth of experience in data analysis and visualisation to our study. Her PhD at Warwick and subsequent work at the Institute of Complex Systems in Palma de Mallorca and at Queen Mary University involved the analysis of large data, time-series, historical databases and genealogical trees. Her background in complexity science is remarkably useful for Meter data.

Dr Marina Diakonova

Meter Data Scientist

We might like to think of our lives as complex. Rushing from work to pick up children, prepare a meal, sort out the washing... however, that is not really complex, it's merely complicated. Complexity science is in fact seeking out the bits that are not so complicated. Are there simple rules that help us find predictable patterns in the relationship between what we do and the shape of our electricity profiles? That relationship can be complex - very complex.

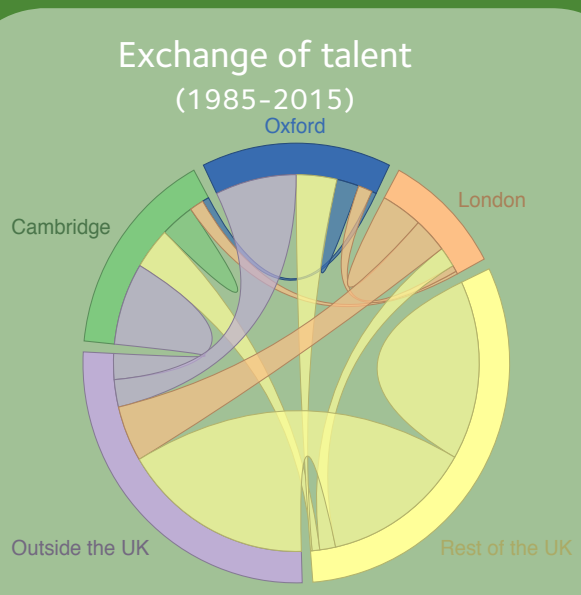
With appliances things are simple (even trivial): when a kettle is on, it uses electrical power - no doubt about it. The question for us is: when is this kettle likely to be used? This will depend on our activity patterns. A whole series of activities and contextual information can help us understand the 'rules' of when people use electricity.

Some of these rules can be simple, yet powerful in explaining behaviours in complex systems. For example, in the past Marina has developed agent based models to observe how opinions form within social networks. With a few simple rules she explored how echo-chambers can form - clusters of people who have very little exposure to dissenting views. Brexit and Trump are good examples where simple rules of selective media exposure have led to divisions in society that barely understand each other. Her work received the editors' choice in Physical Review E and was highlighted in the New Journal of Physics.

Marina's conclusion is that it only takes a small group of tolerant agents transferring information between clusters to diffuse the polarisation of opinions. Let's hope we find similarly simple and promising conclusions for electricity use in households.

Sadly, she has also found that the UK's top Universities are not leading by example. Very few mathematicians exchange between UK universities. It is mostly Universities from outise the UK that supply us with our talent and where our academics progress to.

See next page for Marina's visualisation of household electricity and activity data.



Top UK Universities have little exchange of talent between them. Flows show where mathematicians move to/from to progress their career (i.e. abroad)

Household Gallery

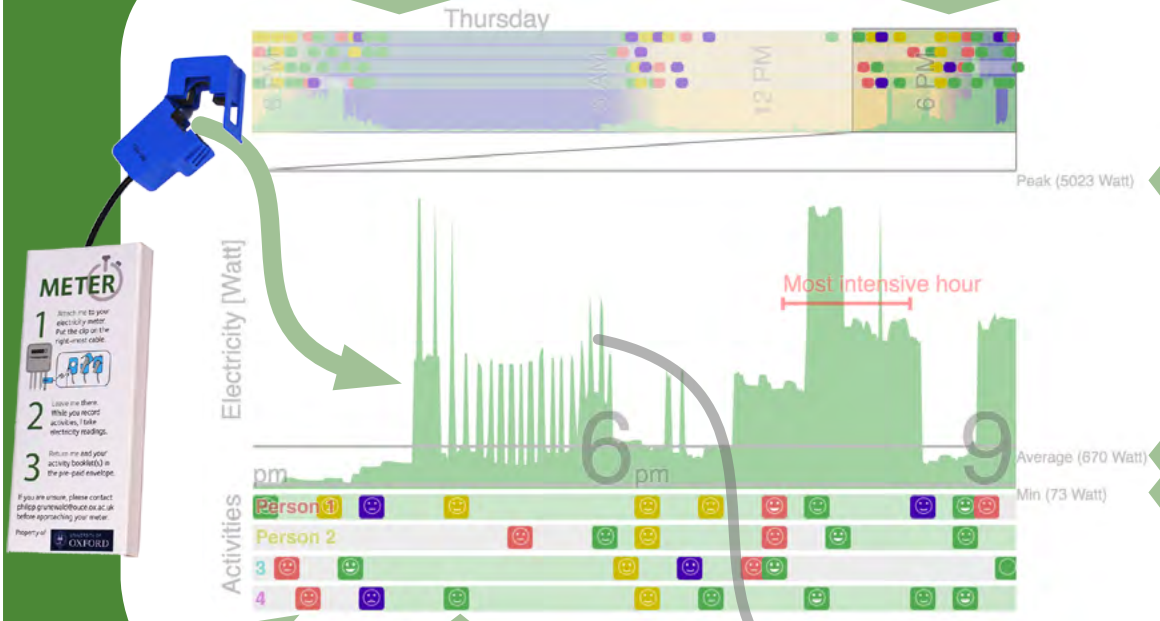
Electricity profiles and activities
available on energy-use.org/gallery

Overview

- 28 hour profile for navigation
- Daytime highlighted in yellow

Zoom window

- 6 hours for detailed veiw below
- Can be dragged left/right



Max Mean Min

Values marked with line and Watt readings

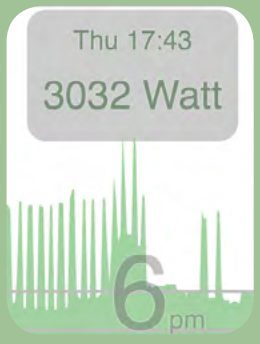
Activity

- Hover for more detail

- Icons show reported enjoyment
- Colours stand for

Power

- Point on graph for reading in Watt
- 1 min resolution



All in the open

All Meter code (and now even some documentation) is kept at

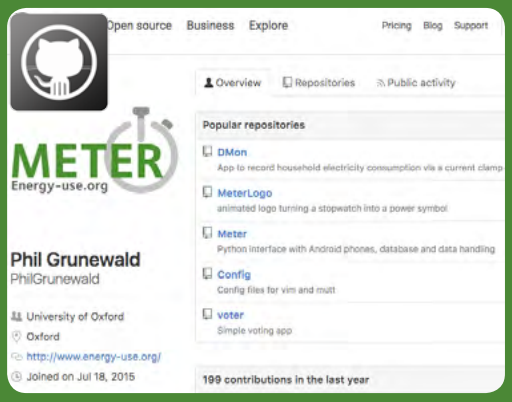
GitHub/PhilGrunewald

New Repositories

- Yourdata - the D3 visualisation tool for electricity and activities
- Activities - all time use codes and screen structure, plus python tools to explore them

Other repos

- DMon - Java based Android app to record electricity
- MeterInterface - manage database, participants and devices
- MeterApp - the diary app developed with Cordova



We have a winner

The first year of free electricity goes to...

Penny W. from London

We decided to give this prize out again this year. Please encourage people to take part, especially if they do nor care about energy - we are short of those in our sample.

Academic outreach

- We recorded 36 items of output for RCUK Researchfish in the past year
- Among them seminars at UEA, Lancaster, Sussex, Exeter, Imperial, Loughborough (well, and Oxford)

Thank You

The success of Meter is only possible with the help of:

1. EPSRC funding
2. Our partners
3. Our participants

A big Thank You to all of you!

EPSRC
Engineering and Physical Sciences Research Council

Meter Partners

Department for Business, Energy & Industrial Strategy

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