



CIBSE Energy Benchmarking Tool – Webinar

29th July 2019

Follow @CIBSE



THE BARTLETT
INSTITUTE FOR
ENVIRONMENTAL DESIGN
AND ENGINEERING



RCUK Centre for
Energy Epidemiology



Webinar programme

- The development of the CIBSE Energy Benchmarking Tool, by Dr Sung-Min Hong, UCL
- Demonstration of the tool, by Dr Anastasia Mylona, CIBSE
- Q&A

CIBSE Energy Benchmarks

Energy efficiency in buildings

CIBSE Guide F



20-2 Energy e

Table 20.1 Fossil and electric building benchmarks — continued

Building type	Energy consumption benchmarks for (kWh/m ²) per year (unless stated)		
	Good practice		Fo
	Fossil fuels	Electricity	
Entertainment (continued)			
— social clubs	140	60	1
— bingo clubs	440	190	1
Education (further and higher)^{27(a)}			
— catering, bar/restaurant	182	137	1
— catering, fast food	438	200	1
— lecture room, arts	100	67	1
— lecture room, science	110	113	1
— library, air conditioned	173	292	1
— library, naturally ventilated	115	46	1
— residential, halls of residence	240	85	1
— residential, self catering/flats	200	45	1
— science laboratory	110	155	1
Education (schools)²⁶			
— primary	113	22	1
— secondary	108	25	1
— secondary (with swimming pool)	142	29	1
Hospitals²⁵			
— teaching and specialist	339	86	1
— acute and maternity	422	74	1
— cottage	443	55	1
— long stay	401	48	1
Hotels²⁶			
— holiday	260	80	1
— luxury	300	90	1
— small	240	80	1
Industrial buildings^{27(b)(c)}			
— post-1995; <5000 m ²	96	—	—
— post-1995; >5000 m ²	92	—	—
— pre-1995; <5000 m ²	107	—	—
— pre-1995; >5000 m ²	103	—	—
Local authority buildings²⁸			
— car park (open)	—	—	—
— car park (enclosed)	—	—	—
— community centres	125	22	1
— day centres	203	51	1
— depots	283	37	1
— sheltered housing	314	46	1
— residential care homes	492	59	390
— temporary homeless units	408	48	467
— town hall (see also office)	138	84	205
Ministry of Defence (MoD) buildings²⁹			
— aircraft hangars (beated)	220	23	—
— junior mess	2.5	1.4	—
— motor transport facilities	317	20	—
— multi-occupancy accommodation	225	29	—
— officers' mess	4.4	2.5	—
— stores/warehouses (occupied)	187	34	—
— stores/warehouses (unoccupied)	54	3	—
— workshops	175	29	—
Offices^{30(a)}			
— air conditioned, standard	97	128	178
— air conditioned, prestige	114	234	210
— naturally ventilated, cellular	79	51	151
— naturally ventilated, open plan	79	54	151
Primary health care (general practitioners' surgeries and dental practices)			
—	174	—	270
Public buildings:			
— ambulance stations ³¹	350	50	460
— churches ³²	80	10	150
— courts (Magistrates) ^{33(a)}	125	31	194

Table continues

CIBSE
Select Benchmark

Education (schools)

Primary School

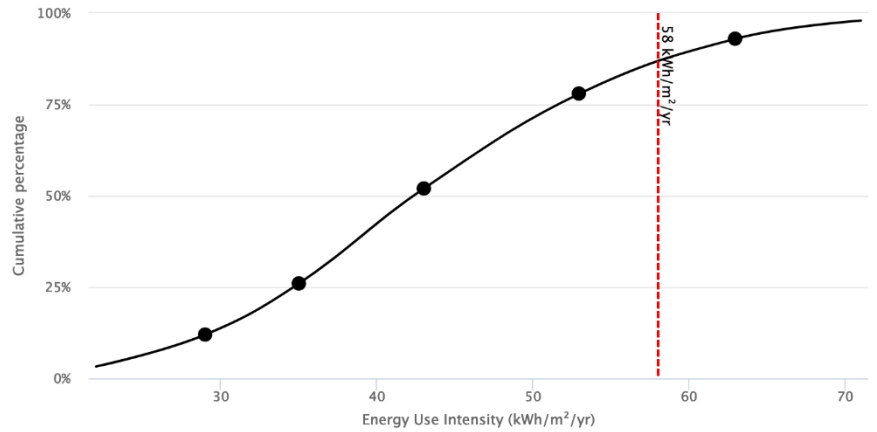
Which fuel?
Electricity Fossil

Spatial Resolution
National

Show your own reading
58

KNOWLEDGE | BUILDING SERVICES | MEMBERSHIP | NETWORKS | ENERGY | TRAINING & EVENTS | MYCIBSE

Building type : Primary School | Spatial Resolution : National | Fuel Type : EuiElec | Sample size : 9127



Building Type	Good practice electricity	Typical practice electricity	Source
Primary School	35	43	DEC

Showing 1 to 1 of 1 entries

* Energy consumption benchmarks for existing buildings in kWh/m2/yr unless stated otherwise



THE BARTLETT
INSTITUTE FOR
ENVIRONMENTAL DESIGN
AND ENGINEERING



RCUK Centre for
Energy Epidemiology



Follow @CIBSE

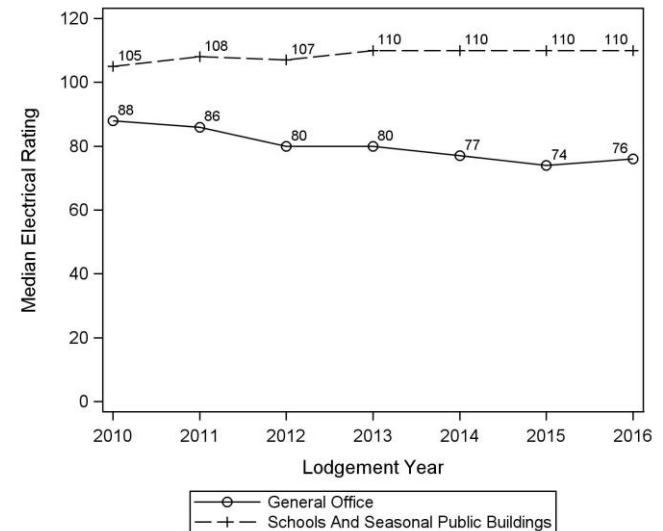
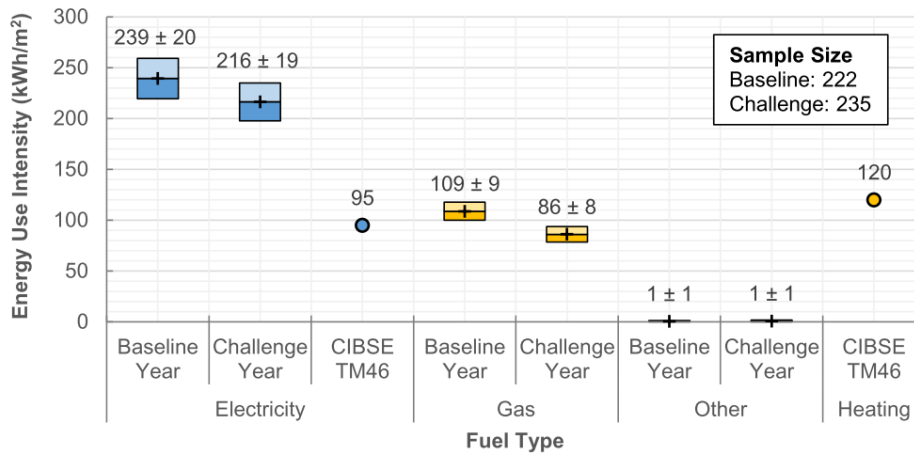
CIBSE Energy Benchmarking Tool

- A collaboration between CIBSE and UCL
- Aim to create a dynamic approach to energy benchmarking that reflects advances in engineering and technology
- Further development of the tool will incorporate personalized user profiles for input of energy use data into the platform

Changing Patterns of Energy Use

- Actual energy use were often found to be different from existing energy benchmarks
- Energy use continues to change over a long period

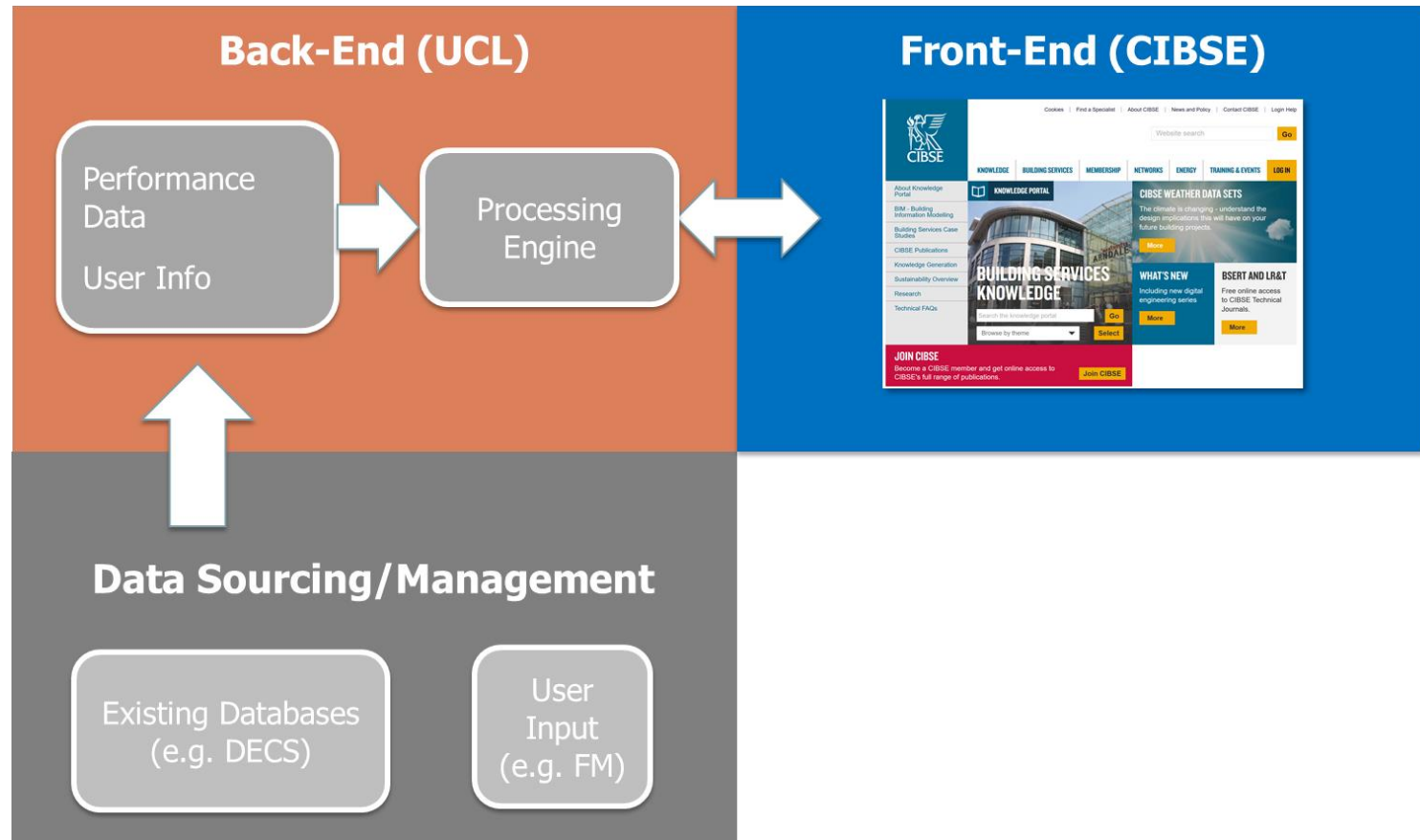
Office premises that use electricity and fossil-thermal fuel



Opportunities and Challenges

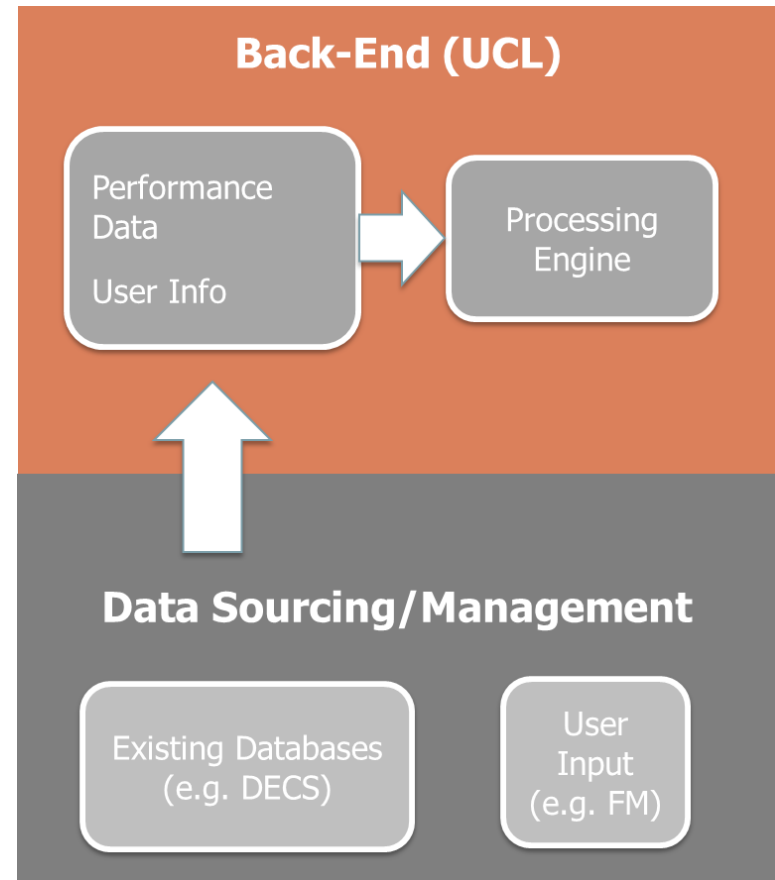
- Develop a more dynamic approach to benchmarking
- Adopt ways for providing more reliable and relevant benchmarks in the digital age
- Explore innovative methods for gathering data from across the stock

Phase 1 Establish Framework



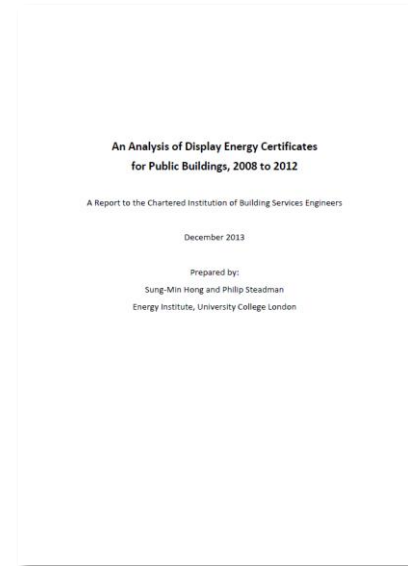
Phase 1 Establish Framework (UCL – CIBSE)

- Two-phase project
- Setting the boundary and objectives
- Establishing a framework
- Foundation for further research



Phase 1 Methods - Data

- Display Energy Certificate (DEC) records collected between 2008 and 2012
- Dataset includes a total of 120,253 records from 46,441 buildings (or sites)
- Data cleaning (duplicates, uncertain records, early renewals, etc.)
- 36,552 buildings (or sites)



This platform aims to gradually update and replace the energy benchmarks in table 20.1 of CIBSE Guide F: Energy Efficiency in Buildings. Currently the majority of the energy benchmarks available in the platform are a direct transfer from the latest edition of Guide F, table 20.1. Revised benchmarks have been introduced for some building types (see below) which are based on the Display Energy Certificates (these covered more than 120k DEC's – for details, [see full report](#)) analysed by UCL under a jointly sponsored project.

Revised energy benchmarks for selected building types in the following categories:

Phase 1 Methods - Data preparation

- Records ending Mar 2010 - June 2012
- Latest records for each building (or site)
- Fossil-thermal EUI weather corrected to 2,021 HDD
- Building types that have sufficient sample sizes (>50)

Building	Assessment end dates					
	Oct 2008	2009	Before Feb 2010	After Mar 2010	2011	Jun 2012
A		•	•		•	•
B	•	•				
C	•					
D		•		•	•	
E					•	•
F	•	•		•		
G		•	•			
H		•				

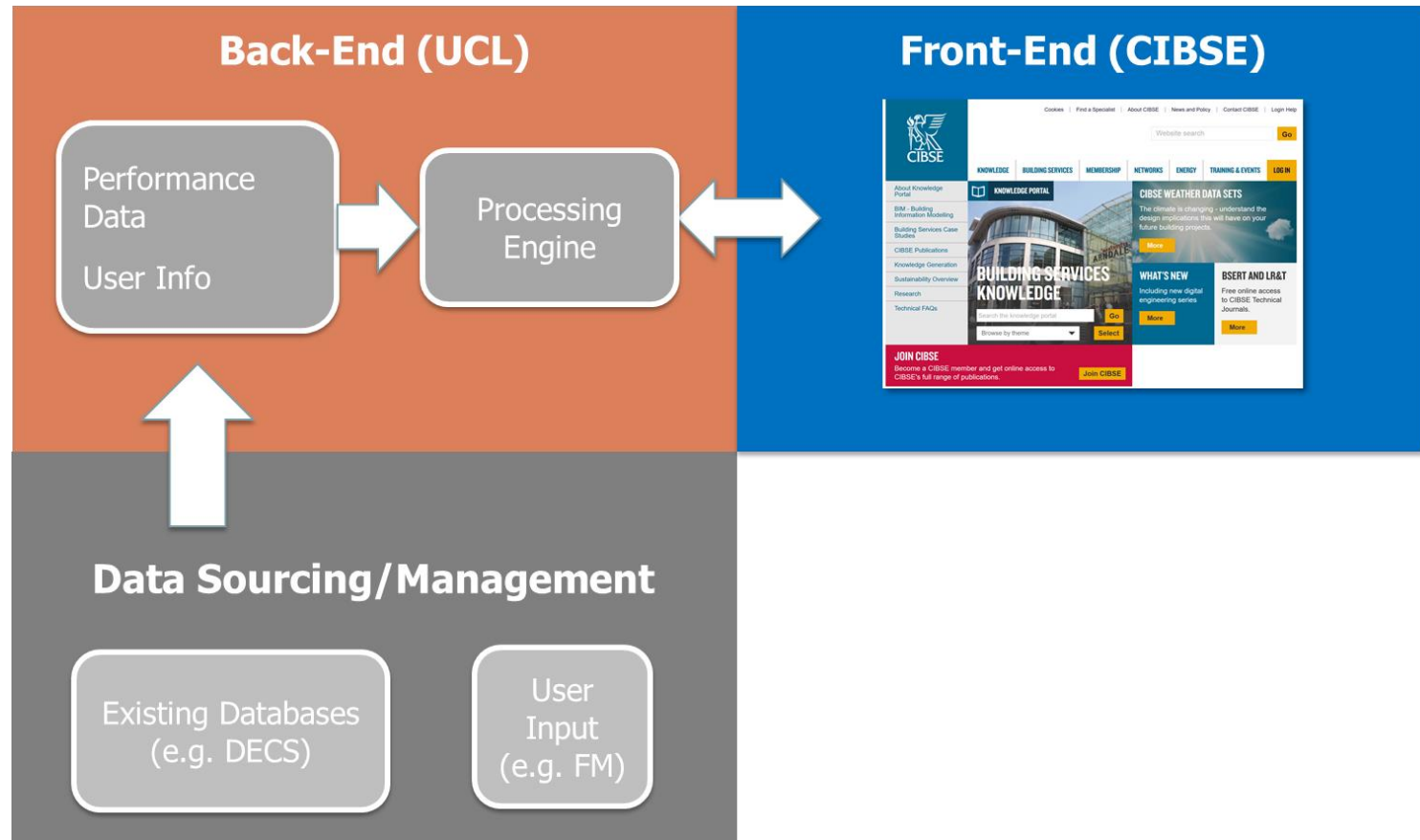
Phase 1 Methods – Classification

- Classification based on CIBSE *Guide F*
- Two-tiered classification similar to CIBSE *TM46*
- Keep energy benchmarks from CIBSE *Guide F* Chapter 20.1 where data is unavailable

Building type
Entertainment: (continued)
— social clubs
— bingo clubs
Education (further and higher) ^{(3)[c]} :
— catering, bar/restaurant
— catering, fast food
— lecture room, arts
— lecture room, science
— library, air conditioned
— library, naturally ventilated
— residential, halls of residence
— residential, self catering/flats
— science laboratory
Education (schools) ⁽⁴⁾ :
— primary
— secondary
— secondary (with swimming pool)

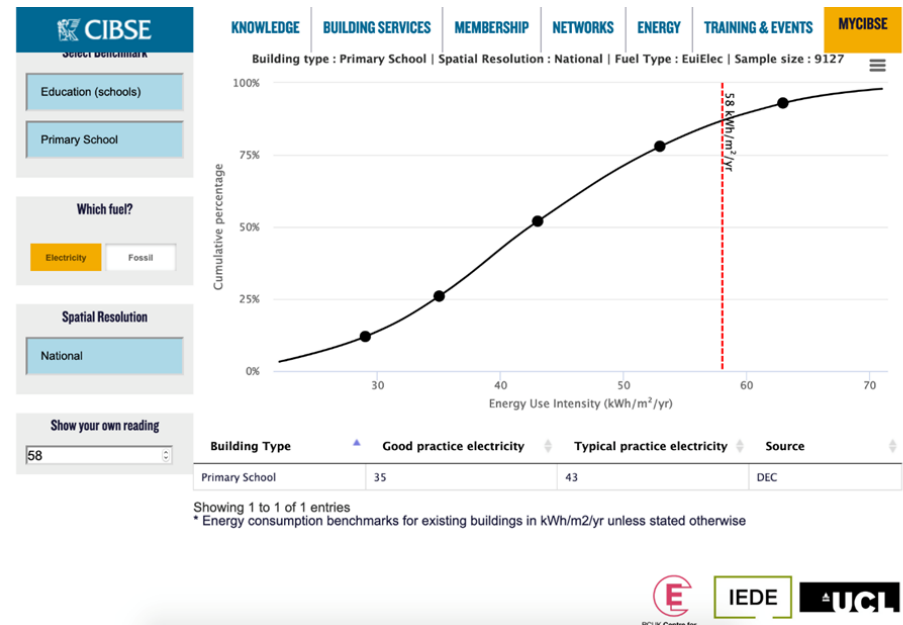
CIBSE *Guide F* Table 20.1

Phase 1 Establish Framework

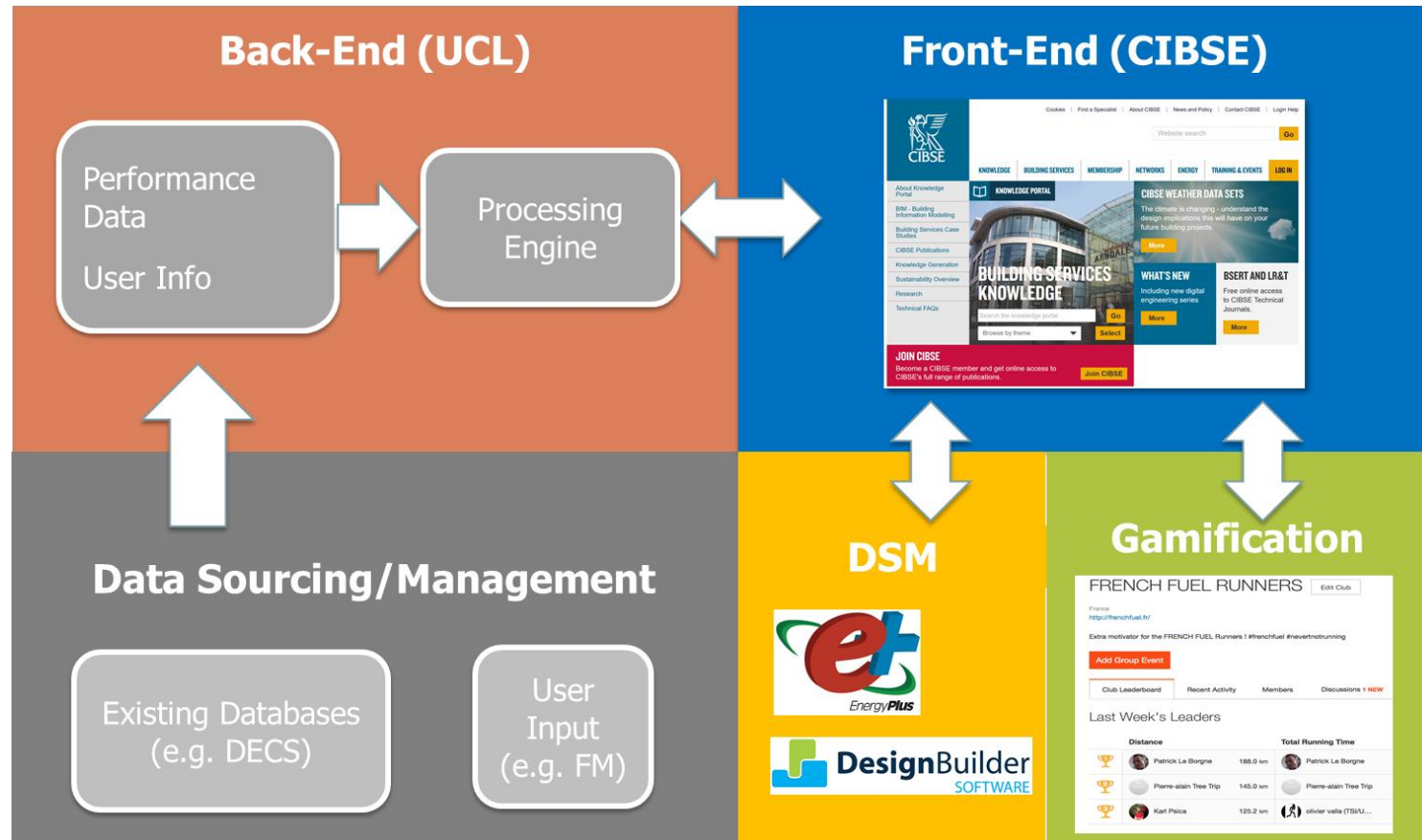


Phase 1 Establish Framework – Next Steps

- Beta testing
- Collect user feedback
- Review and update the tool

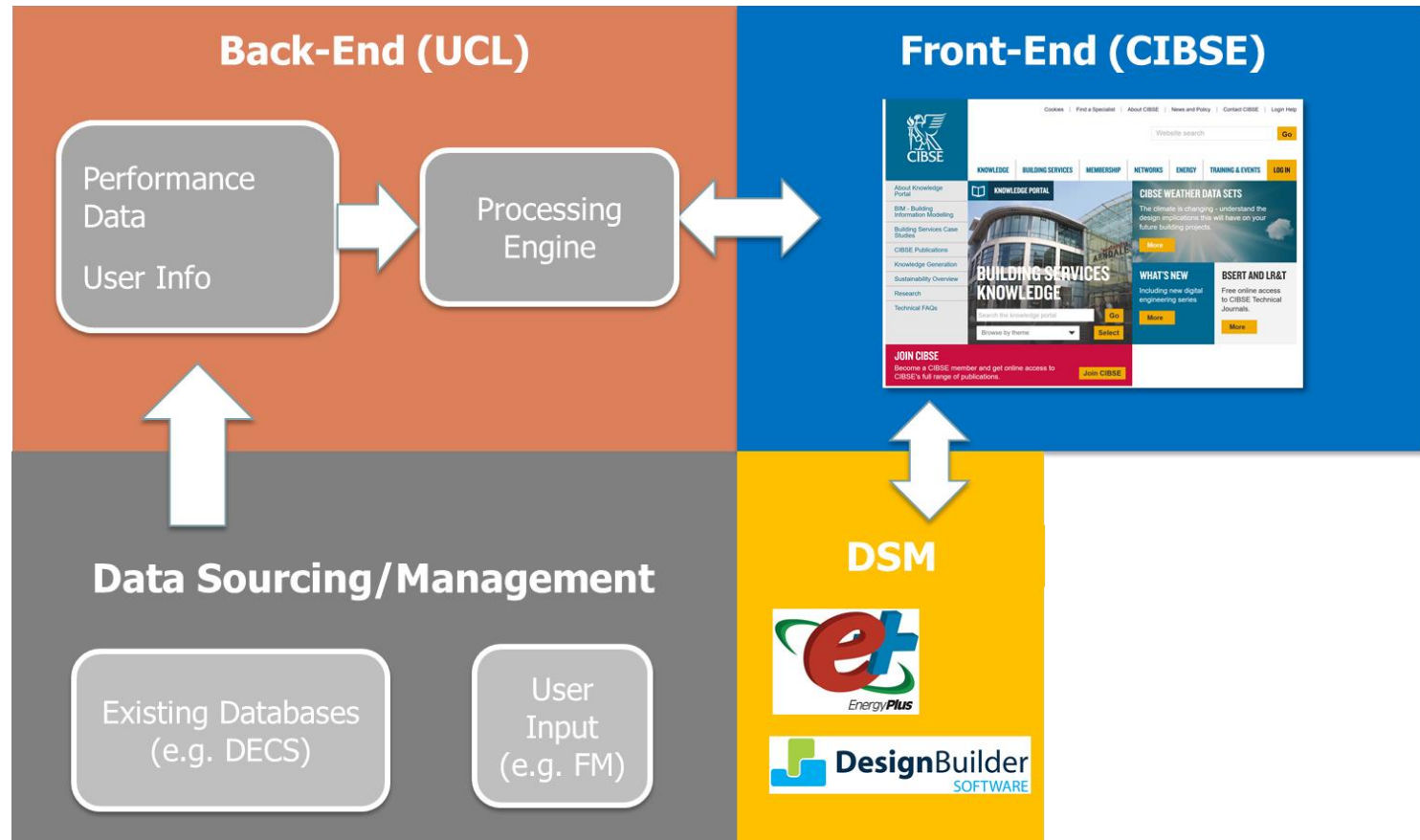


Phase 2 User Engagement



Follow @CIBSE

Phase 2 Industry Professionals



Follow @CIBSE



THE BARTLETT
INSTITUTE FOR
ENVIRONMENTAL DESIGN
AND ENGINEERING

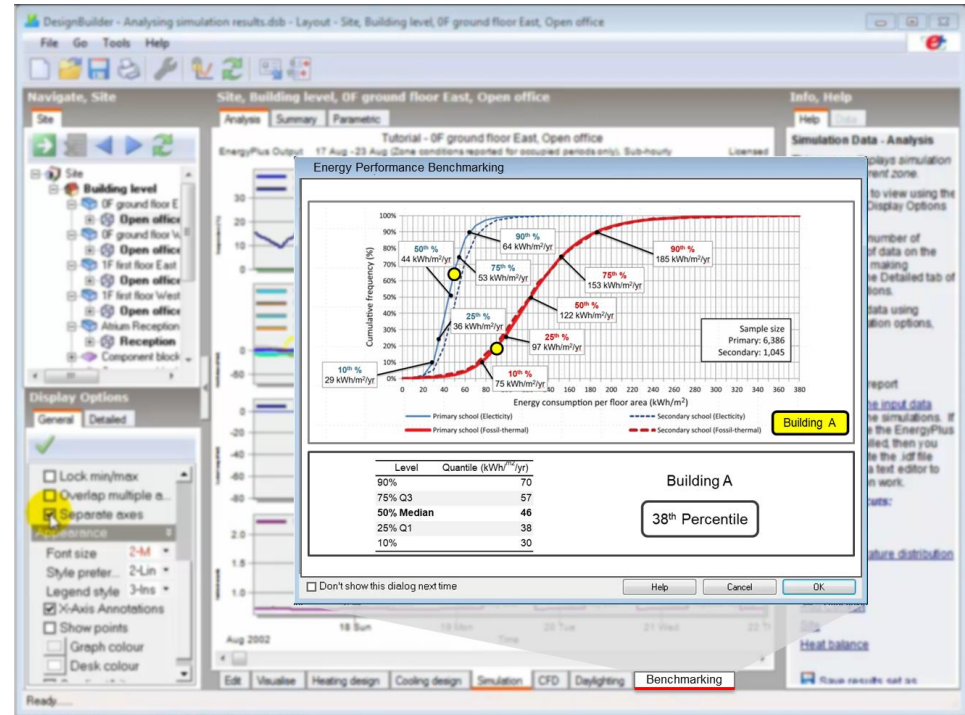


RCUK Centre for
Energy Epidemiology

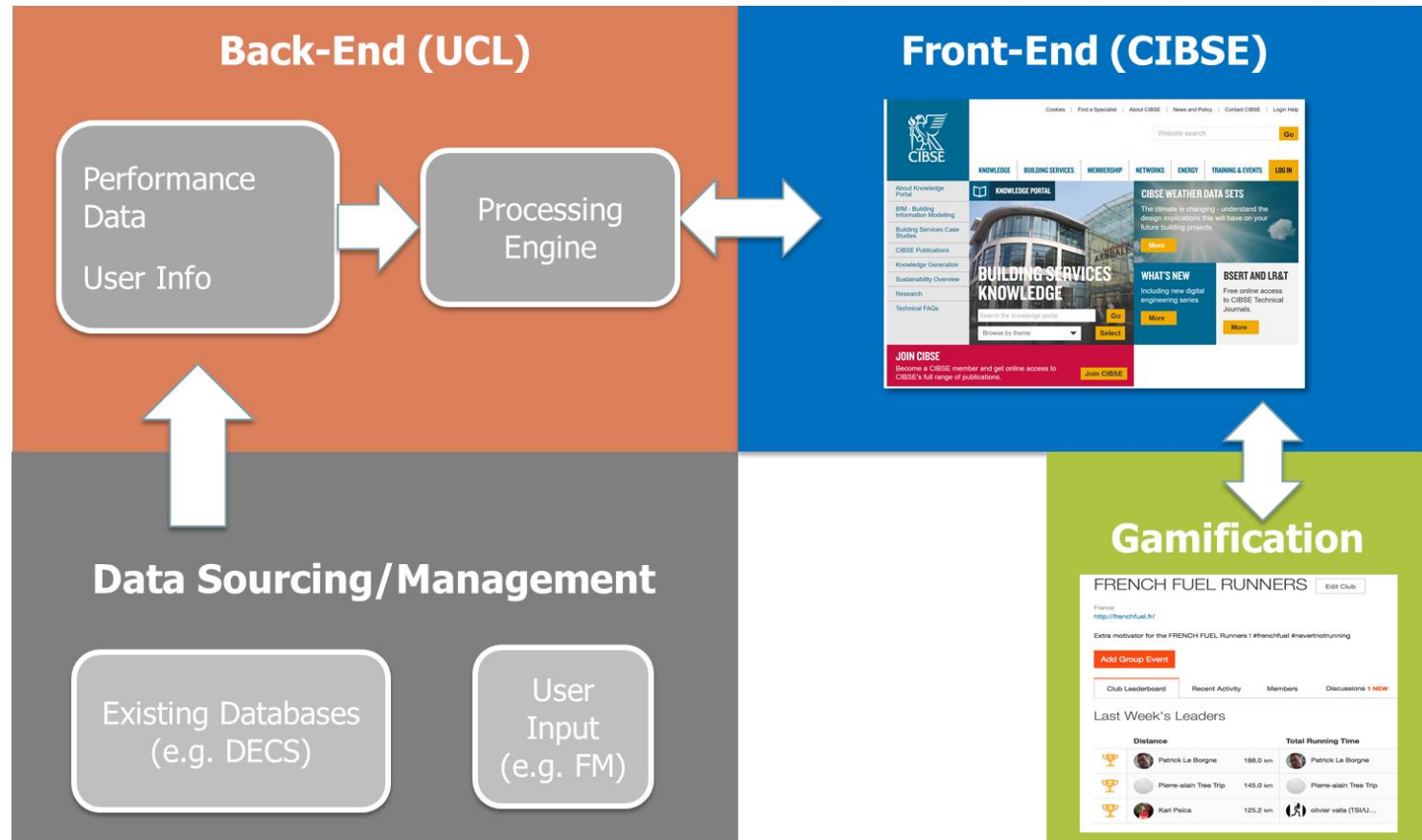


Phase 2 Industry Professionals

- Linking the tool to industry practices
- Utilise CIBSE benchmarks within DSM environment



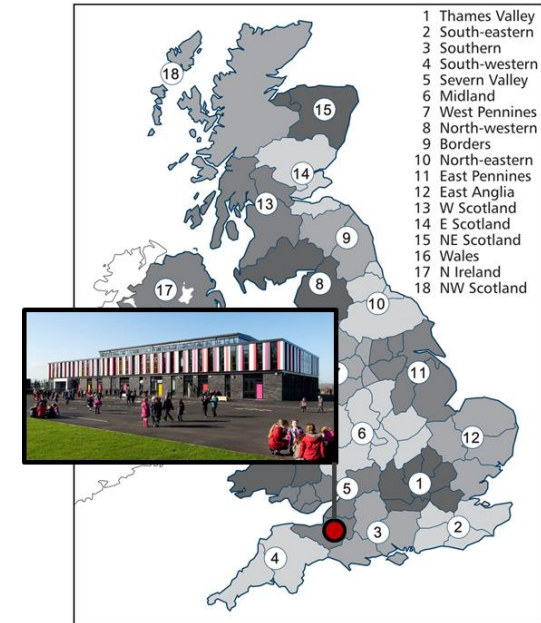
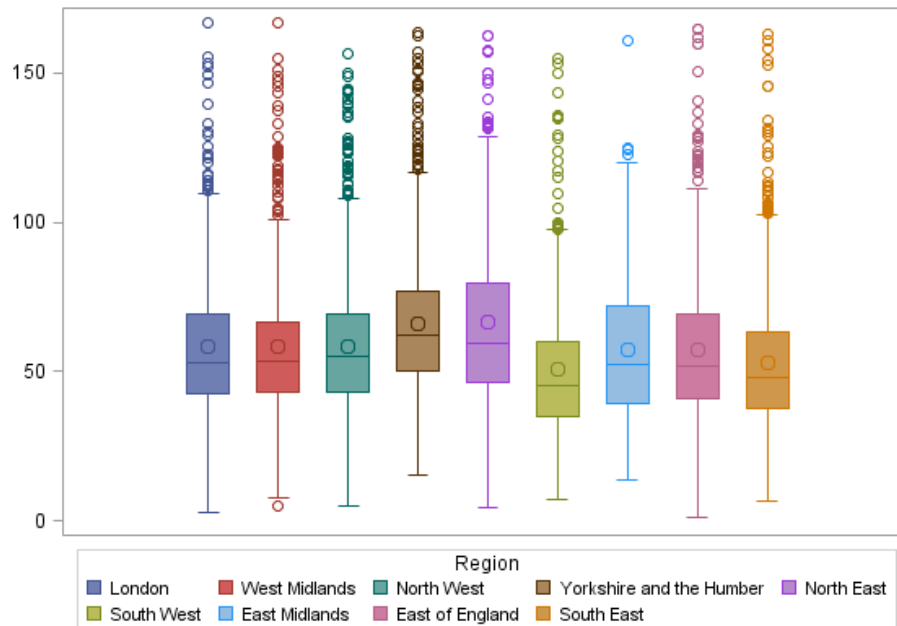
Phase 2 Portfolio/Data Managers



Follow @CIBSE

Development Phase 2.1 – User Input

- Extend capacity of the tool to allow user input
- Peer-to-peer comparison (building types, geographical etc.)



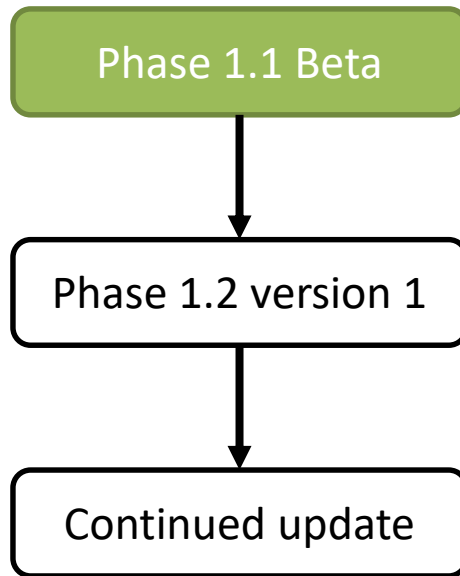
Development Phase 2.2 - Gamification

- Explore and implement data crowd-sourcing function
- Target individuals not organisations
- Provide social applications for engaging professionals who manage energy data
- Provide incentives for sharing data to review and provide new benchmarks

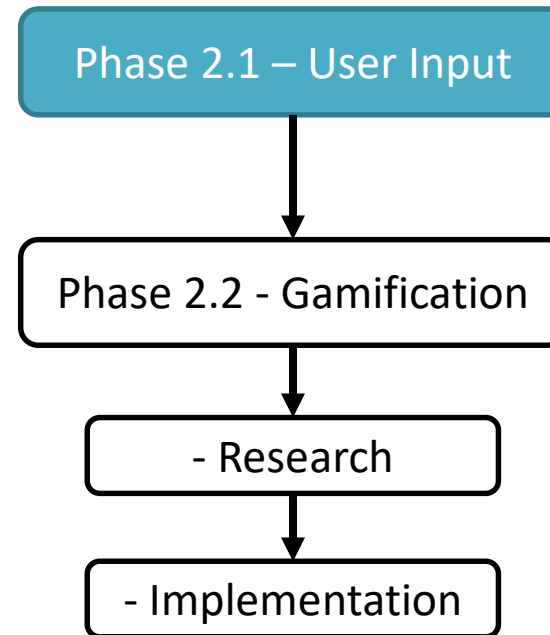


Development Progress/Plan

Phase 1



Phase 2



Thank you

s.hong@ucl.ac.uk

Follow @CIBSE



THE BARTLETT
INSTITUTE FOR
ENVIRONMENTAL DESIGN
AND ENGINEERING



RCUK Centre for
Energy Epidemiology

