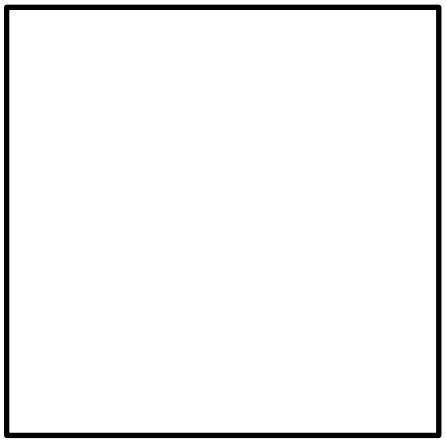
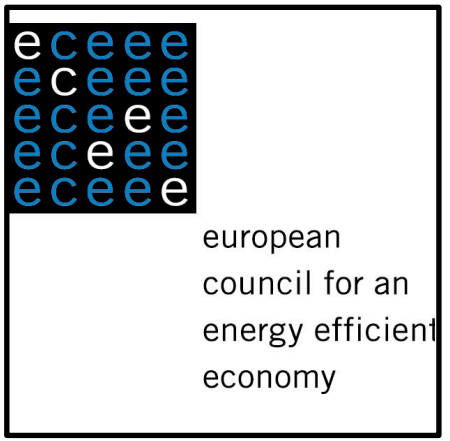
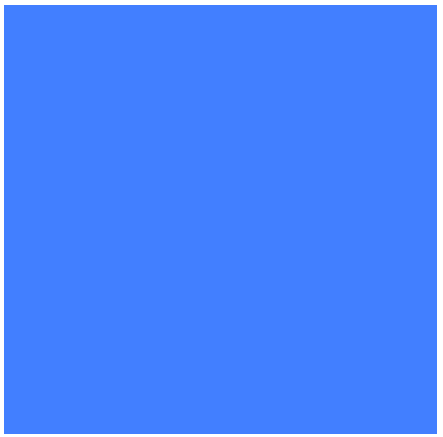
Evaluation of water and energy metering and monitoring practices in European local authorities

Vasco Ferreira

Paul Fleming







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Survey

- (smart or not so smart) Metering and monitoring building water and energy consumption is becoming an important aspect of building energy management;
- PhD programme on analysis of short time series (sub-hourly) energy consumption data;
- Survey to investigate what is happening in the field – energy and water metering and monitoring practices in European municipal buildings;
- All survey answers were from voluntary respondents informed through different European networks of cities: Energie-Cites, ICLEI and CEMR.

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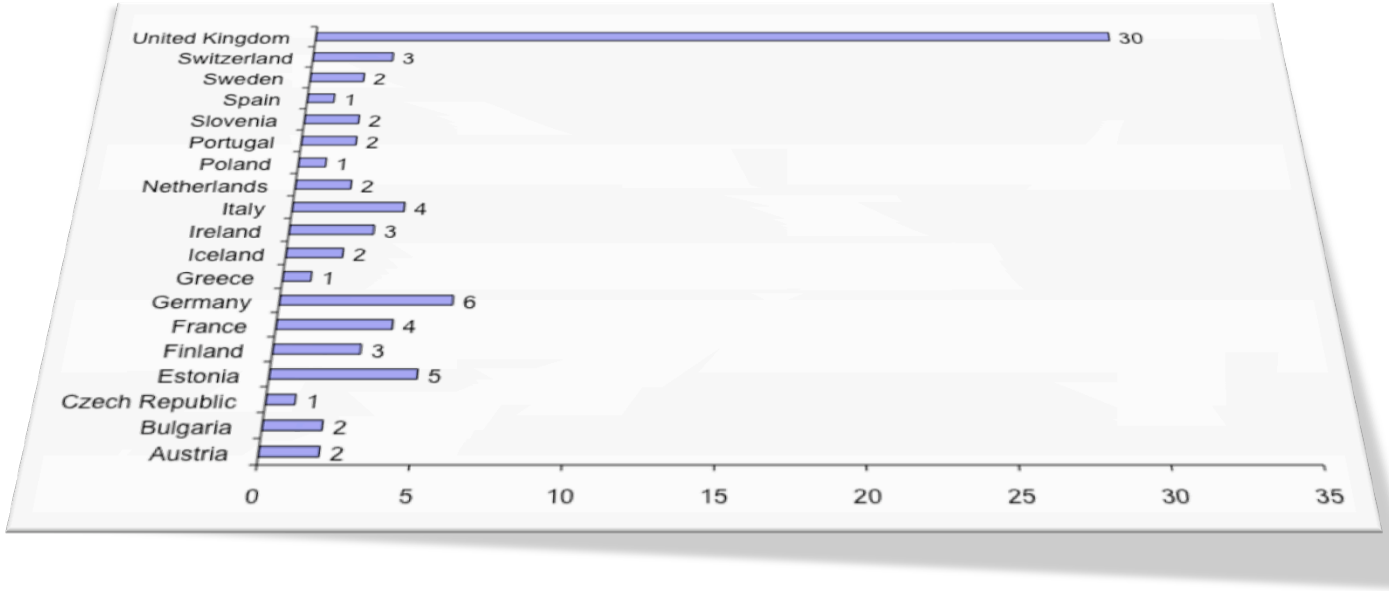
Survey

- The survey had a total of **76 respondents from 19 European** countries,
- Representing energy and/or water consumption in over 63,000 municipal buildings.



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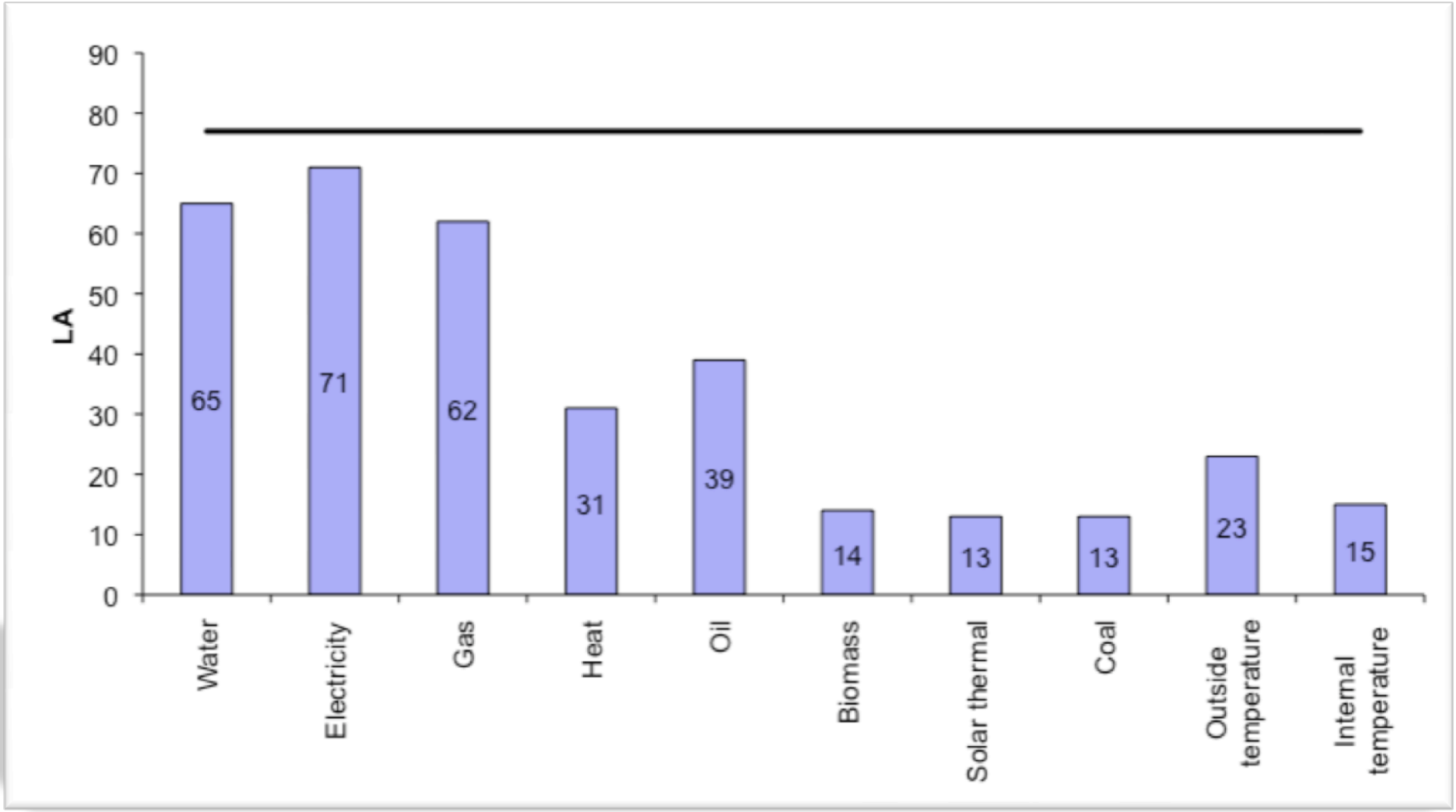
Data collection



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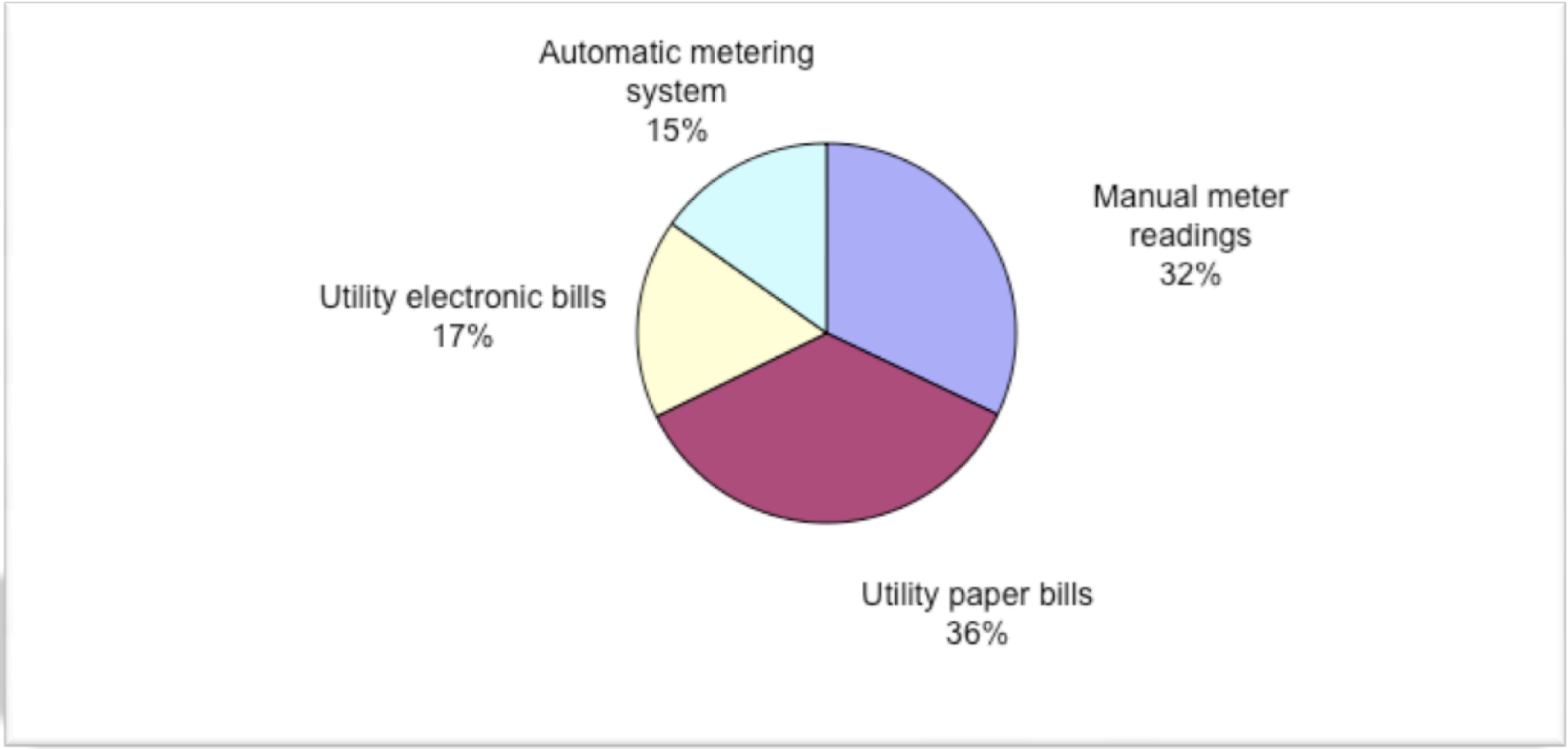
Data collection system



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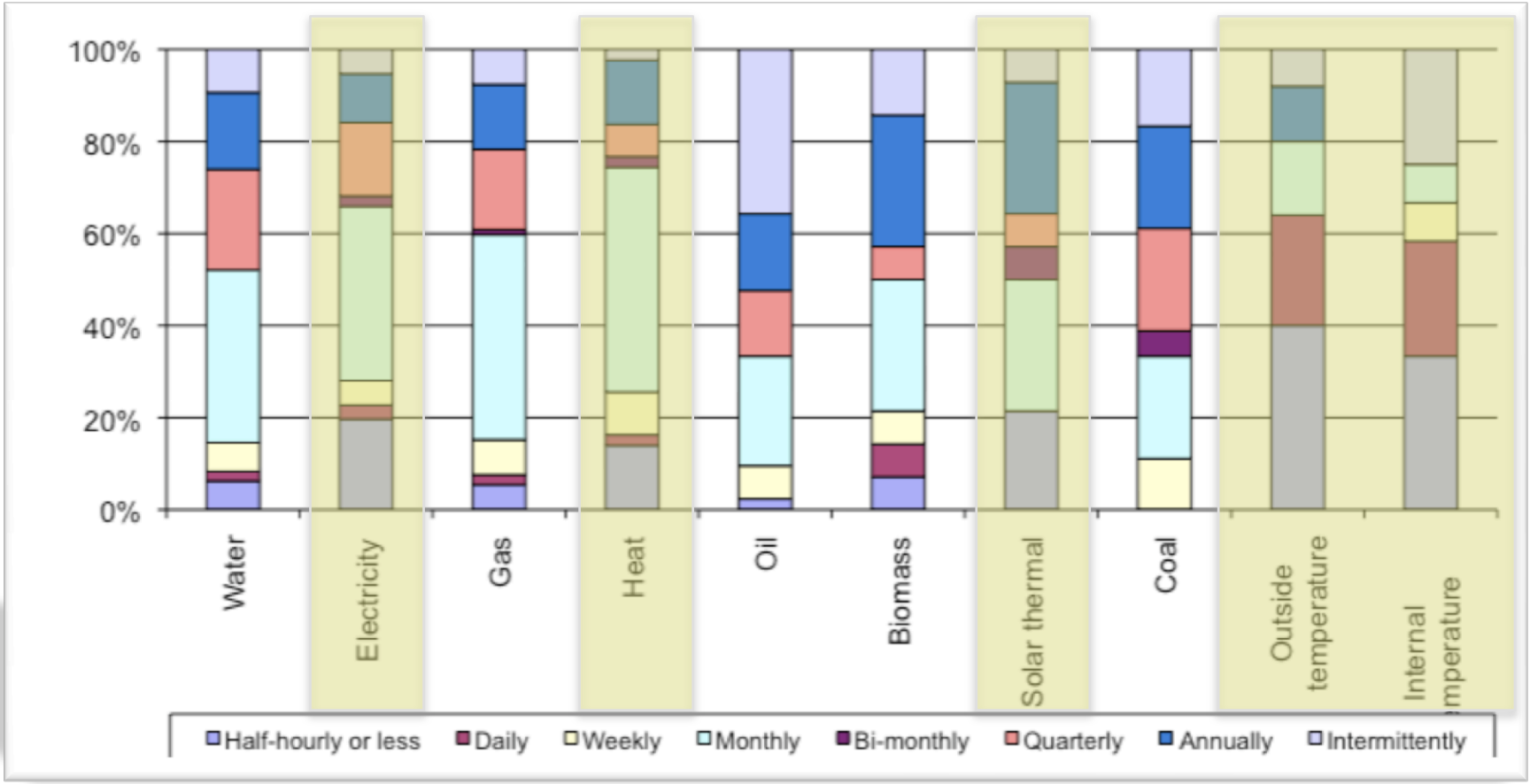
Data collection frequency



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Applications of collected data

- To identify excessively high levels of consumption in normal use (61);
- To verify utility billing data (59)
- To monitor unusually high or low consumption to identify energy wastage (58);
- To measure and verify energy/water savings measures (55);
- To communicate with buildings occupants in order to change behaviour (51);
- …
- Not effectively used (11).

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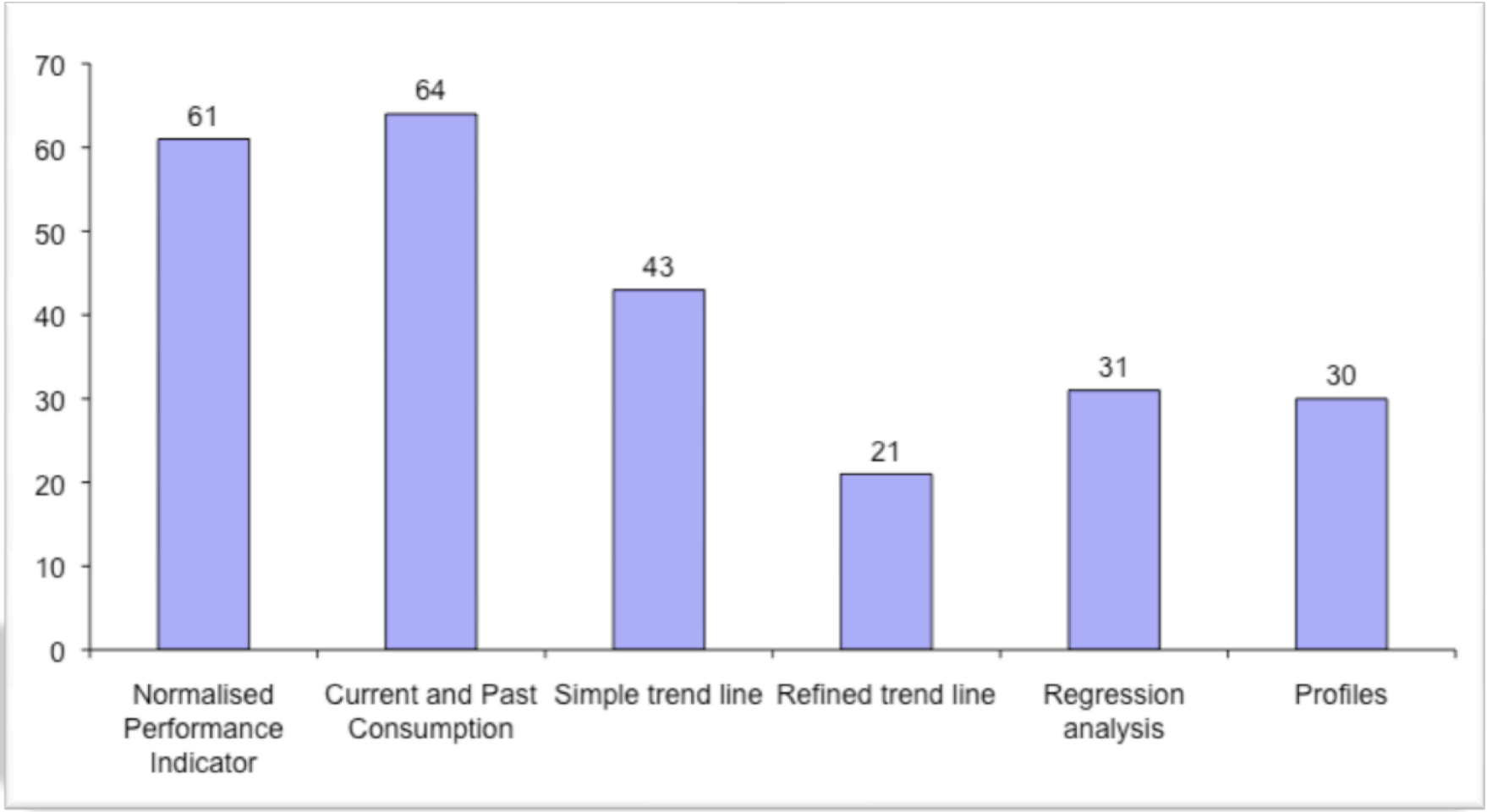
Data analysis



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Energy manager needs - metering

- Automatic metering, constant monitoring and real time data;
- Accurate data (not estimated);
- Data management and secure databases;
- System with flexible data import facilities: manual, invoice, electronic data from utilities and automatic metering.

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Energy manager needs – data analysis

- Normalised Performance Indicators, and EPBD;
- Benchmarking for costs, energy, water and carbon emissions (local and standard);
- Historical comparisons, current and past consumption;
- Weather adjustment and building energy signature;
- Tariff analysis, billing verification and budget forecasting;
- Visualisation of data;
- Exceptions reports, targeting, alarm;

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Energy manager needs – other features

- More automated analysis;
- Easy to use software with user-friendly interface;
- Suitable report templates and custom reporting;
- Report in units that people understand (money, amount of light bulbs, etc.)

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Conclusions I

- Typically data is collected in monthly periods, from paper bills and manual meter readings;
- Data is stored in computer databases and analysed using Excel and commercial software tools;
- Short time series data, is not yet very frequently used, only about 15% of the municipalities in the study have technology that generates this data.

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Conclusions II

- Techniques used by energy managers (including the ones featured in commercial software packages) are not sophisticated enough for dealing with large volumes of data;

- Energy managers need an easy to use, straightforward, and as much as possible automatic software tool to analyse building energy data.

Further research

- Further research on automating metered data analysis;
- Support for data analysis interpretation and to improve building performance assessment using smart meter data;
- For example: New benchmarks for identifying potential energy saving opportunities… Focus of the PhD research!!

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Thank you!

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