# Actual emission measurement in Real Estate

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PCAF PCAF Partnership for Carbon Accounting Financials

#### SETTING THE SCENE

The real estate sector plays a significant role in our society, providing homes, workplaces, and spaces for various activities. However, it also contributes substantially to greenhouse gas emissions, with a profound impact on climate change and sustainability.

Measuring emissions in the real estate sector poses significant challenges. Unlike industries with well-defined emission sources, real estate encompasses a diverse range of source activities, across residential, commercial, and industrial properties, each with its own unique characteristics and energy consumption patterns.

## WHY ACTUAL EMISSIONS MEASUREMENT?

Accounting for the impact that finance has on building sector emissions is challenging and a combination of approaches is needed. PCAF is keen to support financial institutions in defining approaches to effectively access actual measured emission data from their investees and borrowers.

Therefore, PCAF would like to build on the momentum of measurement and disclosure to offer financial institutions enhanced approaches to increase the precision of financed emission measurement.

This action paper documents existing and upcoming approaches that capture actual measured data and presents potential solutions that could support financial institutions in their emission measurement journey.

## Who measures actual real estate emissions? And what are the different approaches?

While access of data to enable actual measurement is still a significant challenge, numerous initiatives attempting to obtain actual or near-actual emissions measurements, across public, private sectors and academia were identified.

During this exploratory work, the following themes were identified:

#### **INNOVATIVE TECHNOLOGY**



Initiatives that focus on introducing innovative solutions to either obtain actual emissions measurements or to model synthetic load profiles based on actual measurements, while adhering to required levels of consumer and data privacy.

# PARTNERSHIPS AND COLLABORATIONS

Partnerships to obtain actual emissions exist across different sectors, such as collaborations between academia and consumers, utilities and the private sector, financial institutions and the public sector, and even across industries.

#### ENERGY PERFORMANCE CERTIFICATES (EPC) FOCUS

EPC focused initiatives attempt to provide a continuous review to the way EPCs are developed, while also focusing on moving from theoretical estimates of energy efficiency to actual measurements.



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## Key initiatives in Europe bridging the gap between theoretical and actual building emissions

## INNOVATIVE TECHNOLOGY

Consumer-owned Digital Building Pass	Synthetic Load Profile Generation	Insights-For-Data	Nearest-neighbour Modelling	Digital Twin Buildings
DSGV (German Savings Bank Association) is piloting a digital building pass that can give banks & third-parties access to actual building data measurements, and consumers control over who can view that data.	Organizations like <b>Fabriq</b> and <b>Kamma</b> are working on primary building data measurements combined with demographic statistics and building typologies to establish synthetic load profiles for different buildings.	Sero and Measurabl exchange consumer smart meter data for insights and analysis on emissions and consumption patterns or their sustainability performance and decarbonization pathways.	By analyzing energy consumption data of buildings, <b>Eliq</b> runs an approach that allows accurate estimation of synthetic load profiles for nearby buildings, reflecting actual measurements.	Approaches such as those by <b>Metrikus</b> create virtual buildings to provide a dynamic and comprehensive view of building operations and performance.

## PARTNERSHIPS AND COLLABORATIONS

Real Estate Owners & Investors	Network Providers & NGOs	Banks & Public Institutes	Researchers & Consumers
Better Buildings Partnership is a data collection framework established to enable members to collect and share energy consumption data across their portfolio, resulting in accurate and reliable information on energy usage and emissions.	The Data for Good program has been focused on collecting, anonymizing, aggregating and leveraging smart meter data directly from the network flow, making the data available to 3rd parties.	The Dutch Central Bureau of Statistics partnered with 6 banks to gain insights into CO <sub>2</sub> emissions and energy consumption of private mortgage portfolios by finding average gas and electricity consumption of properties at a cadastral level of detail.	UCL's Smart Energy Research Lab has been leading a consortium of 7 universities along the Energy Saving Trust to gather smart meter data from 13,000 homes in the UK.

## **EPC FOCUS**

	EPC Framework Review	Virtual EPCs	
Energy Efficiency	OSB Group has been actively reviewing gaps and opportunities to enhance the quality of EPCs. They are also exploring partnerships with energy providers for access to actual measurements, thus enhancing decision-making.	UCL's Smart Energy Research Lab has been creating virtual EPCs from their work collecting smart meter data and creating Digital Building Twins.	



# Data accessibility and privacy challenge

Data accessibility and user privacy are important factors to be considered while measuring actual emissions.

In a residential setting, the willingness to voluntarily share emission data is often non-existent. The disinclination to share energy data at household level is also rooted in fear of misuse of any personal information that might be included in the data.

How can access to consumption data be widened while adhering to required privacy standards and addressing consumers' privacy concerns?

### POTENTIAL SOLUTIONS TO IMPROVING ACCESS TO DATA WITHOUT COMPROMISING PRIVACY

• Consumers voluntarily sign up for the provision of their consumption data.

An example is the UCL's Smart Energy Research Lab initiative in which over 13,000 households' smart meter data were collected.

• Establishing partnerships with energy providers to gain access to asset level data.

Key example would be the partnership between the Data Communication Company and Open Data Institute in which all smart meter data will be shared anonymously with researchers.

- Consumers in the driving seat with full control over their data German Savings Banks Association's (DSGV) consumer owned digital building pass is an example where consumers have full control on choosing the recipients of their data.
- Macro level monitoring and data acquisition on neighbourhood, zip code or district level
   Key example is the work done by the Dutch Central Bureau of Statistics (CBS) where they partnered with six banks to gain insights into CO2 emissions and energy consumption of private mortgage portfolios at a cadastral level of detail.
- Monitoring and insights in exchange for data
   Examples include the work being done by private Software-as-a-Service companies and service providers where data is stored anonymously in databases in exchange for providing insights on energy consumption, decarbonization progress and potential savings for customers



## What comes next

In addition to identifying the various initiatives working on obtaining actual emissions measurements, PCAF would like to further build on the momentum of measurement and disclosure and follow up with these subsequent steps:



Further explore and identify innovative approaches and initiatives through leading creative thinking workshops with interested PCAF participants.

2 Dive deeper into the identified initiatives and approaches to identify collaboration areas.

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Establish national pilot groups to test various approaches. Pilot projects will be selected based on innovation level, ease of implementation, data privacy handling measures and replication potential to other geographies and commercial assets.

Monitoring of pilots and documentation of results.

Presentation and communication of results and recommendations with the wider PCAF community and stakeholders.

The Partnership for Carbon Accounting Financials (PCAF) is a global, industry-led initiative of financial institutions that work together to develop and implement a harmonized approach to measure and disclose the greenhouse gas (GHG) emissions associated with loans and investments, known as financed emissions.

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